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2 8 FEB 1958
NATURAL HISTORY

PROCEEDINGS
OF THE
Bournemouth Natural Science Society

VOL. XLVII

SESSION 1956-57

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VOL. XLVII.
SESSION 1956-57

PUBLISHED BY THE SOCIETY AT ITS HOUSE,
39 CHRISTCHURCH ROAD, BOURNEMOUTH, 1958

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Introductory Note

The objects of the Society are declared in the second of its Rules to be "the promotion of the study of Science in all its branches, and of Public Education, by means of Lectures, Field Meetings, the reading and discussion of Papers, and in any way that the Council of the Society shall deem advisable."

The branches of Science at present represented are as follows:—**Archaeology and History, Astronomy, Botany, Entomology, Geography, Geology, Microscopy, Photography, Physics and Chemistry, and Zoology.**

During the **Winter Session,** from October to April, frequent meetings are held, comprising Lectures on subjects of scientific interest, illustrated by lantern slides, films, epidiascope, diagrams, specimens, and experiments.

Throughout the **Summer Session,** Field Meetings on an average of two or three a week, are held in suitable places in the neighbourhood of the town, or Coach and Train Tours are arranged to districts of scientific interest at a distance.

The management of the Society is vested in a Council, which is elected at the Annual General Meeting.

The Society possesses a Library available for the use of members. Books may be borrowed by members, and there is a Reading Room in which works of reference may be consulted. The Museum contains many valuable scientific collections and specimens. The Library and the Museum serve to illustrate and illuminate the ten Sections of the Society. There is a well-equipped Dark Room for the use of members interested in Photography. The house stands in a pleasant garden of over an acre.

Members are elected by the Council, and pay an annual subscription of £1 10s. 0d. for full membership, or £15 for Life Membership. An Entrance Fee of 5/- is payable upon nomination for election. The Family Subscription (for members of a family living in the same house) is as follows:—First Adult Member, £1 10s. 0d.; Second Adult Member, £1; each additional Adult Member, 10/-; Children between 12 and 18 years, 10/- (Associate Members). Members living six miles or more from 39 Christchurch Road pay half the above rates. Renewable monthly membership, 5/-, is available.

A bi-monthly Programme, giving full details of all meetings, is posted to every member, and a Volume of Proceedings is published annually, of which adult members receive a copy.

Application Forms for Membership and further particulars may be obtained from the Honorary Assistant Secretary,

Miss D. M. LOWTHER, B.Sc.,
Lonsdale, 15 Mayfield Avenue,
Parkstone, Dorset.
(Tel. Parkstone 1219).

Bournemouth Natural Science Society

OFFICERS AND COUNCIL FOR 1957-58

N.B.—University and other qualifications are only attached at first mention of names.

President
D. A. Wray, ph.d., m.sc., f.g.s.

Chairman of Council
A. W. Legat, m.inst.c.e.

Deputy Chairman of Council
H. V. Harris

Council
The Officers and Chairmen of Sections (*ex-officio*).

T. H. Bickel
W. S. Brown, b.sc.
Henry Bury, m.a., f.g.s., f.l.s.
A. J. Butcher, f.r.i.b.a.
H. de Castro
G. E. Caswell, m.b.e., m.c.
E. Chambers, f.l.s.
Mrs. W. Chomé
Major C. L. Cooper-Hunt, m.a., ps.d.
G. Holroyd
A. W. Legat
Mrs. J. B. E. Locke, b.a.
W. J. Read, m.sc., f.r.i.c.
Mrs. I. Sewell
H. K. Stanton
Mrs. Boyd Watt, f.z.s., m.b.o.u.
W. J. Woodhouse, a.c.p.

Chairmen of Sections
Archaeology and History: F. Williamson, f.r.hist.s.
Astronomy: W. P. Winter, b.sc.
Botany: Miss A. K. Harding, b.sc.
Entomology: W. S. I. Cox, f.r.e.s.
Geography: Miss F. M. Exton, b.a.
Geology: D. A. Wray, ph.d., m.sc., f.g.s.
Microscopy: W. L. Whittle, m.i.m.e., f.r.a.s., f.g.s.
Photography: Miss U. Ogle
Physics and Chemistry: H. E. Clarke, m.a., b.sc., f.r.i.c.
Zoology: H. V. Harris

Hon. Treasurer
H. C. Mayo

Hon. Assistant Treasurer
E. V. Pierce

Secretaries
Hon. Secretary: W. A. Stinton
Hon Assistant Secretary: Miss D. M. Lowther, b.sc.
Hon. Assistant Secretary (Programmes): W. L. Whittle

Hon. Librarian
A. A. Foyle

Hon. Assistant Librarian
Mrs. W. Perceval

Hon. Curator
F. Williamson

Hon. Editor
J. H. Bailey

Hon. Auditors
B. C. Cundall and F. Ogden

Hon. Solicitor
G. A. Turner

Bankers
National Provincial Bank Ltd., Bournemouth

COMMITTEES, 1957-58

Finance and General Purposes:

Chairman: A. W. Legat

Hon. Treasurer: H. C. Mayo *Hon. Secretary*: W. A. Stinton

W. S. Brown, H. Bury, A. J. Butcher, E. Chambers, H. E. Clarke, H. V. Harris, Miss D. M. Lowther, W. J. Woodhouse, D. A. Wray

Library:

Chairman: J. H. Bailey

W. Barker, H. E. Clarke, A. A. Foyle, Mrs. J. B. E. Locke, Mrs. W. Perceval, W. J. Read, F. Williamson

Museum:

Chairman: F. Williamson

Chairmen of Sections (*ex-officio*)

Editorial:

Chairman: J. H. Bailey

W. S. Brown, H. Bury, E. Chambers, H. E. Clarke, F. Coleman, M.C., M.R.C.S., F.D.S., Miss F. M. Exton, W. J. Read, W. A. Stinton, W. J. Woodhouse

Garden:

Chairman: Mrs. W. Chome

F. Coleman, Miss A. K. Harding, H. W. Leonard, Miss E. Whitaker

Entertainment:

Chairman: Mrs. I. M. Simmons

J. H. Bailey, Mrs. E. E. Graham-Vine, Miss G. Green, Miss I. E. Sheffield, F. Williamson, W. P. Winter

Bournemouth Natural Science Society.

List of Members

Revised to 2nd December, 1957.

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*Honorary Member
oOriginal Member
vVice-President
wGilbert White Fellowship
†Past President
lLife Member
aAssociate Member

The year of election is given before the name of each member

1952	Adam, Miss A. Irvine	17 Linwood Road
1955	Adams, Mrs. K. L.	Lyngen, Pinewood, Road, Branksome Park, Bournemouth West
1955	Adams, R. J.	7 Woodside Road, Parkstone, Dorset
1956	Adams, Mrs. M. L.	,, ,,
1947	Alcock, J. W.	24a Ovington, Avenue, Iford
1948	Alcock, Mrs. A.	,, ,,
1948	Alcock, Miss J.	,, ,,
1948	Alcock, Miss M.	,, ,,
1955	Alexander, Mrs. E. E.	27 Boscombe Overcliff Drive
1946	Allan, Miss M. W.	Perak, 70 Lansdowne Road
1956	Allison, Mrs. G. M.	9a Southwood Avenue, Southbourne
1956	Ambler, Lieut. Col. M. J.	Min's Cottage, 5a Branksome Wood Road
1955	Ambler, Mrs. A.	,, ,,
1955	Anderson, W. R. B.MUS., F.T.C.L., L.R.A.M., A.R.C.O.	Chine Court, 9 McKinley Road
1943	Appleton, Miss M.	Flat 12, Ingleby, 6 Wimborne Road
1957	Arnold, L.	11 Danecourt Road, Parkstone, Poole
1957	Arnold, Mrs. E. L.	,, ,,
1956	Arthur, Miss D., B.SC.	Bournemouth School for Girls
1952	lAtkinson, Mrs. A. S.R.N.	40 Palmer Road, Oakdale, Poole
1948	Austin, Mrs. G.	31 Amhurst Avenue, Ealing. W.13
1950	Bailey, J. H.	39 Strouden Avenue
1950	Bailey, Mrs. A. A.	,,
1951	wBailey, Miss A. R.	Cressex Lodge, Binfield, Bracknell, Berks
1955	Bailey, Miss F. E. L.	57 St. Catherine's Road, Southbourne
1955	Bailey, Miss G. L.	,, ,,
1955	Balch, Miss M. M., M.B.E., B.A.	42 Saxonbury Road, Southbourne
1957	Baly, Miss O. M.	70 Brackendale Road
1956	Bamber, Mrs. C. T.	Walhampton Cottage, Lymington
1936	*Banham, Miss E.	Greenway Court, Birchwood Road
1951	Barker, W., B.SC.	21b Upton Way, Broadstone
1951	Barker, Mrs. E.	,, ,,
1957	Barnett, Mrs. K. M.	40 Oak Avenue, Christchurch, Hants
1957	Barton-Bullock, Mrs. L.	2 Ravenscourt Road, Southbourne
1956	Bartrop, W. T. C. B.COM.(LOND.) J.P.	39 Verona Avenue, Southbourne
1956	Bartrop, Mrs. M. L.	,, ,,
1957	Bates, W. H., M.I.E.	9 Bodorgan Road
1957	Bell, Mrs. J. L., M.A.	Glendevon, Moorfields Road, Canford Cliffs
1944	Bell, T. M., B.A., M.B., B.CH., M.R.C.S., L.R.C.P.	255 Belle Vue Road, Southbourne
1941	Bell, Mrs. R. M.	,, ,,
1942	Bennett, Miss. D.	Caradon, Canford Cliffs Avenue, Parkstone. Poole
1942	Bennett, Miss M.	,, ..
1943	Bentley, Mrs. E. P.	Singapore

1947	Berrill, Miss M. E.	Russell Court Hotel, Bath Road
1942	Bickel, T. H.	Flat 1, 31 Marlborough Road
1954	Birchenough, Miss K. C.	27 Grand Avenue, West Southbourne
1951	wBlack, Mrs. E.	69 Grosvenor Street, London, W.1.
1956	Blackburn, Mrs. M.	10 Berkeley Mansions, Christchurch Road
1946	Blackmore, H. C., L.D.S., R.C.S.	7 Browning Avenue, Boscombe
1948	Blake, Mrs. N. D.	The Elms, Wheelers Lane, Knighton, Wimborne
1950	Bland, R.	Kinston, Central Avenue, Corfe Mullen
1950	Bland, Mrs. S.	,, ,,
1955	Blicq, Miss G.	Merlyn, Marine Drive, Barton-on-Sea, Hants.
1954	Boggust, A. E. V.	307 Iford Lane
1950	Bone, Miss M. R. M.	6 Groveley Road, Westbourne
1957	Booth, Mrs. L.	41 Cedar Avenue, Christchurch, Hants.
1951	Borrough, W.	Macomb Croft, 9 Florence Road, Boscombe
1956	Boulton, Miss L.	74 Richmond Wood Road
1947	Bowkett, Miss N.	54 Westby Road, Boscombe
1952	Bowring, Miss M.	36 Holdenhurst Avenue
1956	Brain, Miss C. M.	16 Knole Road
1948	Brett, Mrs. A.	2 Carysfort Road, Boscombe
1954	Brooksbank, Mrs. A.	48 Twemlow Avenue, Parkstone, Dorset
1957	Brown, S. C. S., L.D.S., R.C.S., H.D.D.	142 Stirling Lodge, Richmond Park Road
1948	†vBrown, W. S., B.SC.	Three Ways, Christchurch Road, Longham, Wimborne
1920	Brumell, Miss M.	7 Windermere Road
1951	wBull, A. W. M., C.B.	Broom House, Chiltern Road, Hitchin
1957	Burgis, Mrs. E.	Trystworthy Flats, No. 7, Block A, 20 St. Stephen's Road
1937	Burrow, Mrs. D. M., PH.D., B.SC.	107 Alumhurst Road
1922	Burton, E. St. J. F.G.S., F.R.S.A.	St. Anne's, Seaward Avenue, Barton-on-Sea
1922*	†vBury, Henry, M.A., F.L.S., F.G.S.	The Gate House, 17 Alumdale Road
1930	Bury, Miss G. J.	,, ,,
1946	Busby, Miss G.	4 Harbour Close, Haven Road, Canford Cliffs
1952	Butcher, A. J., F.R.I.B.A.	Boldre, Golf Links Road, Ferndown
1945	Butler, G. W.	Old Park Farm, Lytchett Matravers
1947	Butterworth, J. F.	2 Forest Road, Branksome Park
1948	Butterworth, E. P.	,, ,,
1954	Byrt, A. H., C.B.E.	14 St. Winifred's Road
1954	Bywater, F. J., G.B.E., M.C.	Summerhill, Hightown, Ringwood, Hants.
1954	Bywater, Mrs. H. E.	,, ,,
1953	Cadwell, W. H., M.I.C.E.	St. Helen's, 238 Higher Blandford Road, Broadstone, Dorset
1953	Cadwell, Mrs. D. A.	,, ,,
1928	LCalkin, J. B., M.A., F.S.A.	Virginia House, Langton Matravers
1934	*†vCameron, Prof. J., M.D., D.SC.	63 Grove Road
1950	Cashmore, Group-Capt. E. M.	Windrush, Whitehouse Hill, Wimborne
1950	Cashmore, Mrs. A.	,, ,,
1955	Caswell, G. E., M.B.E., M.C.	67 Chatsworth Road
1955	Caswell, Mrs. K.	,, ,,
1944	†vChambers, Ernest, F.L.S.	Flat A, Pendennis, Derby Road
1950	Chambers, Mrs. E.	,, ,,
1955	Chambers, Miss H. M.	Stratton Audley, 2 Tower Road, Bournemouth West
1945	Cheesman, Mrs. A.	The Ken, Walkford, Christchurch
1945	Child, Miss L. M.	37 Sunnyhill Road, West Southbourne
1912	*Chilver, Miss K. M.	2 Shaftesbury Road
1951	Chomé, E. E. P.	6 Alyth Road
1942	Chomé, Mrs. W.	,,
1943	Chomé, Miss M.	,,

1950	Churches, Mrs. E. W., M.B., CH.B.	The White House, Colebrook, Street, Winchester
1945	†vClarke, H. E., M.A., B.SC., F.R.I.C.	64b Surrey Road
1945	Clarke, Mrs. M.	,,
1927	*Clay, R. C. C., M.D., F.S.A.	The Manor House, Fovant, Wilts.
1946	Cohen, E., F.Z.S., M.B.O.U.	Hazelhurst, Sway
1951	Coleman, F. M.C., M.R.C.S., F.D.S.	Empress Hotel, Exeter Road
1926	*Cooper, H. A.	White Lodge, 8 Oban Road
1941	LCooper, Mrs. E. M.	,, ,,
1951	LCooper, Miss R. I.	,, ,,
1945	Cooper-Hunt, Major C. L., M.A., R.A.CH.D. (Retd.)	19 Marine Drive East, Barton on-Sea
1945	Cooper-Hunt, Mrs. E. G.	,, ,,
1957	Corby, J. W.	Berkeley Hall Hotel, Cliff Cottage Road
1952	Corser, Miss G. M.	8 Redhill Crescent, Moordown
1954	Cowdroy, Mrs. F.	Mount Royal, Terrace Mount
1956	Cox, Miss M. G. E.	Chantelle, 10 Dulsie Road, Talbot Woods
1948	Cox, W. S. I., F.R.E.S.	248 Castle Lane
1948	Cox, Mrs.	,,
1956	Crawshaw, Mrs. M.	2 Spring Slade, Cliff Drive, Canford Cliffs
1957	Cressell, Mrs. A.	38 Horsa Road, Southbourne
1954	Cundall, B. C.	Homelands, 27 Redhill Drive
1954	Cundall, Mrs. A. E.	,, ,,
1903	*oCurtis, W. Parkinson, F.R.E.S.	Ladywell Cottage, Tower Road, Branksome Park

1954	Dacombe, H. V.	9 Derby Road
1947	d'Aguilar, Lt.-Col. C. B.	c/o Lloyds Bank, Lansdowne Crescent, East Cliff
1940	Dailey, Miss K.	Flat 14, Ingleby, 6 Wimborne Road
1950	Davidson, Miss M. S., M.A., B.SC.	Bournemouth School for Girls, Gervis Road
1951	Davis, Miss G. H.	Moorlands, The Grove, Ferndown
1956	Davis, H. M., A.C.A.	Needleswood, Lindsay Road, Branksome Park, Bournemouth
1949	Day, J.	60 Brackendale Road
1952	Day, Mrs. E. T.	,,
1930	*de Castro, H.	Yarlington, Springdale Avenue, Broadstone
1955	Deakin, R. H., M.SC.	Coppins, Harvey Road, Canford Magna, Wimborne
1957	Dear, Miss D.	23 Burnham Drive
1935	Derry, Mrs. H. E.	Charnwood, Belle Vue Road, Southbourne
1947	Dewdney, H. F.R.C.O., L.R.A.M.	15 Wellington Road
1949	Dixon, Miss H.	62 Christchurch Road
1953	Dudley, D. J.	17 Widdicombe Avenue, Parkstone, Poole, Dorset
1955	Dudley, Mrs. I.	,, ,,

1953	Eaton, Mrs. V. W.	33 Branksome Wood Road, Bournemouth West
1956	Edmonds, Miss K. E.	74 Namu Road, Winton
1946	Ellison, Prof. F. O'B., M.D., F.R.A.S.	Pine Apple Cottage, Burton
1956	Elwell, Miss G.	Noah's Ark Café, Dunstable, Beds.
1950	Evans, Mrs. E. E. M., B.A.	113 Western Avenue, Ensbury Park
1954	Evans, W. J., B.A., B.SC., F.R.G.S.	19 Kingsway, Ferndown, Wimborne, Dorset
1955	Exton, Miss F. M., B.A.	10 Foxholes Road, Southbourne
1956	Eyers, H. P.	31 Gorsehill Road, Poole

1919	Farmar, Mrs. K. A.	Whitton Lodge, Stevenson Crescent, Parkstone, Poole
1922	Farmar, Miss E. A.	” ”
1956	Farquhar, H.	The Bassetts, Knyveton Road
1952	Fenton, Mrs. O.	24-26 Poole Road, Bournemouth West
1956	Fergusson, Mrs. C.	708 Christchurch Road, Boscombe
1957	Fiddes, Mrs. I. A.	Sapatoom, Sway Road, Bashley, New Milton, Hants.
1955	Finch, Miss D. A., B.SC.	4 Deanscroft Road, Redhill
1934	Finnis, Miss F. M.	15 Julian's Road, Wimborne
1957	Firth, Mrs. M. K.	Awapuni, Newton Road, Canford Cliffs
1951	wFisher, J.	The Old Rectory, Ashton, Northampton
1957	Fishlock, H. W., B.SC.	319 Belle Vue Road, Southbourne
1957	Fishlock, Mrs. F.	” ”
1950	Fletcher, Mrs. V.	c/o Mr. J. Fletcher, Thorn's Beach, nr. Beaulieu, Hants.
1954	Follett, Mrs. V.	Windward, 5 Mayfield Avenue, Parkstone, Poole
1942	Ford, Miss C.	13 Beaufort Road, West Southbourne
1937	Forrest, Miss C. D.	Hiproof, 7 Benellen Road
1925	Fountain, E. D., L.R.C.P., M.R.C.S.	Vron, 30 Mansfield Road, Parkstone, Poole
1956	Fountain, Mrs. M. E.	” ”
1945	Foyle, A. A.	24 R. L. Stevenson Avenue
1953	Frampton, Miss S. M. A.	The Hawthorns, Gravel Lane, Ringwood, Hants
1948	Francis, Miss E.	Beverley, Barton Lane, Barton-on-Sea
1957	Francis, Miss E. G.	” ”
1953	Fraser, Miss M. H., B.A.	2 Ken Road, Southbourne
1956	Frost, Miss W. L.	Rawdon, Oak Road, New Milton, Hants.
1956	Gandy, Mrs. L.	11 Cranleigh Gardens, Southbourne
1955	Gardiner, P. C., F.R.I.C., M.I.CHEM.E., M.INST.GAS.E.	61 Ophir Road
1952	Genge, G. F. S., M.B., B.S., M.R.C.S., L.R.C.P.	11 Westbourne Park Road
1951	Goddard, Miss E. F.	Allendale, 215 Holdenhurst Road
1937	Gompel, Mrs. M.	12 Chigwell Road
1949	Goodhart, Mrs. M.	West Thorpe, Lymington
1956	Goodman, Miss J. R.	Kenora, 4 Pine Wood Road, Branksome Park
1942	Gorringe, Miss K.	11 Branksome Dene Road, Westbourne
1956	Graham-Vine, Mrs. F. E.	16 Chine Crescent
1953	Gray, Miss E.	44 Edmondsham House, Terrace Road
1956	Green, Miss G.	17 Clifton Road, Parkstone, Poole
1944	Greg, Mrs. F.	9 Hengist Road, Boscombe
1952	Gregory, A. W., A.M.I.E.E., F.R.G.S.	Flat 2, Marybourne, 4 Manor Road
1955	Gregory, Mrs. L. G.	” ”
1956	Gregson, Miss D. L.	14 Oban Road
1957	Griffin, Miss M. J. E.	19 Corhampton Road, Boscombe
1941	Gwyther, W. T.	12 Foxholes Road, Southbourne
1956	Habershon, Miss E. M.	Leas Court, Cliff Drive, Canford Cliffs
1931	Haines, Mrs. E. M.	Appleslade, Ringwood, Hants
1951	Haines, Miss G. M.	” ”
1951	Haines, Miss R. M.	” ”
1955	Hall, Mrs. M.	4 Hadden Road, Queen's Park
1957	Halliday, Mrs. M. S.	20 Meyrick Park Crescent
1957	Halloran, Mrs. D. A. B.	c/o Lloyd's Bank, 45 Old Christchurch Road
1956	Hamel, Mrs. F. M.	1 Radcliffe Court, Manor Road
1951	Hanbury, Miss O. T.	Moorlands, The Grove, Ferndown, Dorset
1953	Hancock, Mrs. C. E.	912 Castle Lane East, Iford

1956	Hanford, S. B.SC.	Woodlands, New Road, Parley Cross, Wimborne, Dorset
1956	Hanford, Mrs. C. M.	,, ,,
1955	Hannam, Mrs. W.	Windyridge, Bashley, New Milton, Hants.
1954	Harding, Miss A. K., B.SC.	23 Fairfield, Christchurch, Hants.
1957	Harding, H. F.	D2, Pine Grange, Bath Road
1957	Harding, Mrs. E.	,, ,,
1951	Harlock, Miss M. L.	44 Heather View Road, Branksome
1953	Harris, Lady A. S.	Lockner Holt, Chilworth, Surrey
1955	Harris, H. V.	Monterey, Lone Pine Drive, Ferndown, Dorset
1956	Hart, Mrs. C. M.	15 Stour Way, Christchurch, Hants.
1932	*Hatton, Mrs.	Dutch House, Cliff Road, Barton-on-Sea
1951	Hawker, Mrs. E.	64 Alumhurst Road
1955	Hawkins, Miss M. K.	Moor House, Beaufoys Avenue, Ferndown, Wimborne, Dorset
1955	Hawkins, Miss P. M.	,, ,,
1949	Hayley, Miss V. G.	Sandykeld Hall, Manor Road
1951	Hayman, Miss M. S.	39 Queen's Park South Drive
1956	Hayward, H. A., O.B.E., F.G.S.	Saxholm, Seacroft Avenue, Barton on-Sea, Hants.
1956	Heath, Mrs. C.	2 Richmond Court, Hawkwood Road, Boscombe
1951	Henderson, J. G.	Beacon Royal Hotel, West Cliff
1954	Henderson, Miss V.	19 Ashmore Avenue, Hamworthy, Poole, Dorset
1954	Hermon, J. A.	43 Stourcliffe Avenue, Southbourne
1957	Hickman, Mrs. L. R.	34 Carbery Avenue, Southbourne
1952	Hilton, Mrs. D.	East Dyke, Higher Clovelly, Bideford
1956	Hinchcliffe, Mrs. F. L.	7 Berkeley Mansions, Christchurch Road
1956	Hinton, Miss E. M.	1 Lonsdale Road
1952	Holroyd, G.	4 Beechey Road
1957	Hooper, Mrs. F. H.	10 Oban Road
1956	Hughes, H., M.B.E.	Harcourt Hotel, Derby Road
1951	wHughes, T. C., M.A., F.S.A.	Oakrigg, Scotsforth, Lancaster
1957	Hunt, W. H.	36a Studland Road, Westbourne
1930	Hurt, Miss C. E. C. J.	Flat 31, Ingleby, 6 Wimborne Road
1952	Imlach, Mrs. M. G., B.A.	Crofton Redcotts, Wimborne, Dorset
1954	Irwin, J. V.	16 Duncliff Road, Southbourne
1954	Irwin, Mrs. B. C.	,, ,,
1956	Jagged, Miss M. E.	24 Poole Road
1956	James, B. C.	50 Ivy Road, Merley, Wimborne
1956	James, Mrs. O. E.	,, ,,
1933	James, Mrs. M. G.	70 St. Albans Avenue
1945	Jenkins, Miss P.	Hinton St. Michael, Christchurch
1957	Jenoure, Miss	Eagle Crest, Belle Vue Road, Parkstone, Poole
1957	Jenoure, Miss D.	,, ,,
1930	Jubb, Miss O.	12 Oban Road
1956	Kay, Mrs. M. C. R.	Pine Lodge, 11 Chester Road, Branksome Park
1956	Kaye, Mrs. N.	4 Pine Avenue, West Southbourne
1956	Keith-Walker, S.	Hawkley, Lower Pennington Lane, Lymington, Hants.
1956	Kelliher, Miss F. I.	16a Alumdale Road, Westbourne
1928	Kendall, Miss G. J., A.R.C.M.	20 Serpentine Road, Poole
1946	King, Miss A.	18 Branksome Wood Road
1944	Kirke, Miss M.	11 Radcliffe Court, 51 Manor Road
1948	Knight, Miss A.	Apia, Fairview Road, Broadstone
1956	Knight, Miss M. E.	24 Lansdowne Road

1952	Lacey, Miss M. A.	North Brook, 10a Wimborne Road
1955	Lambe, Mrs. R.	Lampeter Hotel, Central Gardens
1942	Lanham, Miss O.	31 Gorsehill Road, Poole
1950	Lanning, J. P.	2 Gainslea Court, Derby Road
1950	Lanning, Mrs. C. M.	,, ,,
1956	Lavender, J. H., B.SC., A.R.C.S.	Heather Lodge, Bransgore, Christchurch, Hants.
1947	†vLegat, A. W., M.INST.C.E.	39 Christchurch Road
1948	Leonard, H. W.	1 Neville Court, Derby Road
1948	Leonard, Mrs. N.	,, ,,
1957	Le Roy, Miss E. S. H.	Forest Mead, Tyrell's Ride, Burley, Hants
1957	Le Roy, Miss M. C. G.	,, ,,
1950	Lincolne, Miss H. M.	8 Park Lane, Southwold, Suffolk
1951	Lloyd, G. B., B.A.	58 Glenferness Avenue
1950	Locke, G. S.	85 Seafield Road, Southbourne
1950	Locke, Mrs. J. B. E., B.A.	,, ,,
1947	Logan, Miss A.	51 West Cliff Road, Bournemouth
1952	Logie, Mrs. G.	179a Richmond Park Road
1939	Lowde, Miss E., B.A.	Kilmory, York Road, Broadstone
1955	Lowe, H. M., M.SC., F.R.I.C.	40 Oak Avenue, Christchurch, Hants.
1955	Lowe, Mrs. J. M.	,, ,,
1951	wLowe, Mrs. D. M.	43 Marryat Road, Wimbledon, London, S.W.19
1934	Lowther, Miss D. M., B.SC.	Lonsdale, 15 Mayfield Avenue, Parkstone, Poole
1951	wLyver, Mrs. D. J.	Grove Lodge, Burgess Hill, Sussex
1951	wMacmillan, W. E. F.	Botton Hall, Danby, Yorks.
1956	Maddox, Mrs. L. M.	31 Egerton Road, Queen's Park
1951	Magee, Mrs. M. L.	21 Carbery Avenue, Southbourne
1956	Marks, Miss K. M.	11 Ennerdale Road, Kew Gardens, Richmond, Surrey
1948	Markwick, Miss D.	67 Norton Road, Winton
1952	Marsh, K. J. J., L.R.I.B.A.	Little Place, Harbour Road, Southbourne
1951	Marsh, Mrs. V. W.	,, ,,
1946	Marshall, Miss D.	76 Palace View, Bromley, Kent
1954	Marshallsay, Miss E. N.	6 Overcliff Mansions, 1 Manor Road
1954	Marshallsay, Miss L. E.	,, ,,
1957	Mason, Miss G.	58 Southbourne Road, West Southbourne
1957	Mathews, Miss G. B.	25 Wingfield Court, Manor Road
1950	Mayo, H. C.	18a Elgin Road
1950	Mayo, Mrs. S. E.	,, ,,
1956	McClay, H.	64 Blake Dene Road, Lilliput, Poole
1956	McClay, Mrs. A. E.	,,
1952	McDougal, Mrs.	8 Dunkeld Road
1953	McKeown, Miss K. E.	15 Ravine Road
1950	Meggett, Lt.-Col. E. E., V.D.	14 Southlea Avenue, Southbourne
1950	Meggett, Mrs. K. M., M.B.E.	,, ,,
1950	Mersen, Miss A., B.SC.	175 Belle Vue Road, Southbourne
1929	Meyrick, Sir George, BART.	Hinton Admiral, Christchurch
1956	Middlemast, A. H.	86 Hengistbury Road, Southbourne
1956	Middlemast, Mrs. M.	,,
1951	Millar, Mrs. S. A. T.	101 Penn Hill Avenue, Parkstone, Poole
1956	Mills, Miss N.	20 Marlborough Road
1949	Moir, Mrs. F.	Ochiltree, Oakley Hill, Wimborne, Dorset
1957	Moore, W.	139 Alder Road, Parkstone, Poole
1954	Morgan, H. H.	14 Huntley Road
1954	Morgan, Mrs. H. E.	,,
1955	Moss, C. A.	Flat E41, San Remo Towers, Boscombe
1957	Mott, Miss J. H.	19 Gresham Road, Winton
1952	Mullins, Mrs. S.	14 Grand Avenue
1951	wMundy, Miss M. E.	56 Lancaster Gate, London, W.2
1950	Murray, Mrs. M. L.	72 Anthony's Avenue, Lilliput
1935	Muspratt, C. K., M.A., F.R.G.S.	25 East Avenue
1935	Muspratt, Mrs.	,,

1939	Newsome, S. H.	184 Belle Vue Road, Southbourne
1939	Newsome, Mrs. E. C.	,, ,,
1954	Newton, Mrs. K. F.	2 Montague Road, Boscombe
1955	Nicol, Miss M.	4 Haddon Road, Queen's Park
1943	LNicholls, Miss G.	17 Waltham Road
1956	Norman, Miss E. I. V., B.A.	70 Lymington Road, Highcliffe, Hants.
1953	Northover, Miss W., B.SC. (London)	Bournemouth School for Girls, Gervis Road
1929	Ogden, Miss E.	c/o Westminster Bank Ltd., 27 Old Christchurch Road
1948	Ogden, F.	30 Grosvenor Court, Vale Road
1948	Ogden, Mrs. G.	,, ,,
1950	Ogle, Miss U.	Little Wyfold, Frankland Crescent, Parkstone
1948	Osborne, Mrs. B. E.	B6, San Remo Towers
1950	Owen, J. S.	2 Rotherfield Road, Boscombe
1944	Owen, Mrs. E.	,, ,,
1955	Pardoe, Miss E. M.	16 Mortimer Road
1945	Paris, Lt.-Col. A., R.E., (ret'd.)	10 Carbery Avenue, Southbourne
1956	Paris, Mrs. G.	,, ,,
1950	Paterson, Miss M. W.	12 Glebe Avenue, Enfield, Middlesex
1945	Penny, Miss A.	Linkfield Court Hotel, Knyveton Road
1916	*LPenrose, Miss F.	Little Picket, Hightown, Ringwood
1916	*LPenrose, Miss M., B.SC.	,, ,,
1948	Perceval, Mrs. W.	7 Benellen Avenue
1950	†Peters, Sir R. A. M.C., M.A., M.D., F.R.S.	3 Newnham Walk, Cambridge
1954	Pettifer, F., M.P.S.	48 Twemlow Avenue, Parkstone, Dorset
1953	Pickering, V. T.	Francesca, Hightown, Ringwood, Hants.
1953	Pickering, Mrs. C. G.	,, ,,
1952	Pierce, E. V.	Little Bushey, 63 Leybourne Avenue
1952	Pierce, Mrs. E. L., M.B.E.	,, ,,
1956	Piggin, Mrs. K. I.	Oaklands, Burley, Hants.
1955	Porter, Miss D. A.	Grove Lodge, 2 Manor Road
1957	Powis, Mrs. M. E.	37 Wheaton Road, Pokesdown
1956	Preston, Mrs. G. H.	Green Ways, 19a Knyveton Road
1946	Prideaux, Mrs. A.	Upmoor, Ravine Road, Canford Cliffs
1946	Prideaux, Miss C.	,, ,,
1951	wQuillet, L. A.	"Sevenoaks", Springfield, Chelmsford
1956	Rawlings, Miss M.	5 Hampton Court, Branksome Wood Road
1953	Rayment, Miss S. M.	A7, San Remo Towers, Sea Road, Boscombe
1946	Rayner, Mrs. K. B.	Grove Hotel, Grove Road
1951	Rayson, Mrs. M. C. J.	83 Watcombe Road, Southbourne
1945	†vRead, W. J., M.SC., F.R.I.C.	15 Carbery Avenue, Southbourne
1946	Read, Mrs., F.Z.S.	,, ,,
1957	Reakes, Rev. G. S.	48 R. L. Stevenson Avenue, Westbourne
1957	Reakes, Mrs. K. A.	,, ,,
1956	Reynolds, C. R.	14 Foxholes Road, Southbourne
1956	Reynolds, Mrs. N.	,, ,,
1945	Richards, Miss E., B.SC.	8 Overcliff Mansions, Manor Road
1942	Richards, Miss M.	Stour Lodge, 11 Julian's Road, Wimborne
1954	Richardson, Mrs. L.	48 Twemlow Avenue, Parkstone, Poole, Dorset
1926	Rix, Miss M. E. de B.	Wayside, 5 Stourcliffe Avenue
1949	Robertson, Mrs. M.	41 Christchurch Road
1954	Robertson, Miss V. L.	G.14, Pine Grange, Bath Road
1949	Robertson, Mrs. W.	50 Alum Chine Road, Westbourne
1939	Robins, E. A., F.R.P.S., F.L.S., F.R.M.S.	Fairway, Stanley Road, Waterford, Lymington
1953	Robins, F. W., F.S.A., F.R.G.S.	4 Harewood Avenue, Southbourne

1923	Roden, Miss E. M.	12 Walpole Road, Boscombe
1947	Rooke, Dr. K. B., M.B., B.CH., M.B.O.U.	Cranborne, Wimborne
1956	Rowe, Miss Y., B.A.	Uplands School, Parkstone, Poole
1935	Rush, Miss C. J.	9 East Avenue
1951	Rushton, Mrs. E.	113 Alumhurst Road
1951	wSalisbury, Sir E., D.SC., F.R.S., F.L.S.	Croindene, Strandway, Felpham, Bognor Regis, Sussex
1954	Saunders, Miss W. A.	Montrose, 11 Portman Crescent, Boscombe
1938	Seare, Mrs. H.	Almer, Blandford
1957	Searle, Mrs. K.	Berkeley Hall Hotel, Cliff Cottage Road
1956	Seaton-Burridge, Mrs. F. J.	3 Douglas Road, Southbourne
1951	wSecretan, S. D.	Swaines, Rudgwick, Sussex
1950	Sedgewick, Mrs. G.	46 West Cliff Road
1957	Senell, Mrs. H. M.	52 Talbot Road
1941	Sexton, Miss F.	60 Uplands Road
1951	Sewell, Mrs. I.	4 Maundeville Crescent, Christchurch, Hants.
1948	Shears, Miss E.	24 Poole Road
1933	Sheffield, Miss I. E.	6 Lonsdale Road
1950	Shillidy, G. A., C.I.E.	Flat 10, 31 St. Peter's Crescent
1957	Shillidy, Mrs. M. C.	,, ,,
1944	LShorthouse, B.	Brookside Cottage, Exeter Lane
1937	Simmons, Mrs. I. M.	Trigonia, Spur Hill Avenue, Parkstone, Poole
1954	Simper, J. W.	2 Neville Court, Derby Road
1920	Simpson, N. Douglas, M.A., F.L.S., F.R.M.S.	Maesbury, 3 Cavendish Road
1956	Skeggs, Mrs. E. J., B.A., LL.B.	Queen Anne Cottage, Little Canford, near Wimborne, Dorset
1954	Smith, Mrs. G. M.	208 Sandbanks Road, Parkstone, Poole, Dorset
1955	Smith, Miss M. D., L.L.A.	4 Deanscroft Road, Redhill
1951	Smooker, Miss G. M.	5 Meon Road
1951	Smooker, Miss L. G.	,,
1947	Smythe, Mrs. M.	Sherwood, Irving Road, Southbourne
1957	Soane, Mrs. E.	27 Stirling Road
1957	ASoane, Master J. V. N.	,,
1947	Sobbe, Miss D.	Manica, Tower Road, Branksome Park
1940	Somerville, Mrs. S.	Rumah Kechil, Pinewood Road, Ferndown
1957	Spink, W. W.	23 Keith Road, Talbot Woods
1949	Stanton, H. K.	1097 Christchurch Road
1953	Stinton, Mr. W. A.	Penton House, Talbot Drive, Bournemouth
1954	Stinton, Mrs. D. B.	,, ,,
1956	Stray, J. F.	Browngates, Barton Lane, Barton-on-Sea, Hants.
1957	Stray, Mrs. S. B. M.	,, ,,
1947	Stuart-Harris, Miss M., B.SC.	Woodways, Merley Lane, Wimborne, Dorset
1946	Stuart-Harris, Miss W., B.SC.	,, ,,
1942	Styche, Mrs. E. L.	Heather Dene, Blake Hill Avenue, Parkstone, Poole, Dorset
1950	Sworder, Miss R.	12 Grosvenor Court, Vale Road, Bournemouth
1953	Symonds, Miss V. G.	The Knapp, Studland, Dorset
1955	Taylor, Mrs. B.	164 Belle Vue Road, Southbourne
1937	Terrel, G. H.	53 Wentworth Avenue, Boscombe
1951	wTierney, Dr. C.	Netherton, Coulsdon, Surrey
1951	wTierney, Mrs.	,, ,,
1951	wTilling, W. G.	20 Streathbourne Road, Upper Tooting, London, S.W.17
1951	Tottenham, R. C.	The Elms, Wheeler's Lane, Knighton, Wimborne

1956	Trail, Miss L. M.	Boscombe Cottage, 18 Wharncliff Road
1957	Trotman, H. L.	Alington, 10 Littledown Road
1955	Tucker, H. W. H.	8 Connaught Crescent, Parkstone, Poole, Dorset
1949	*Turner, G. A.	Winchester House, Fir Vale Road
1950	Venning, Brig. F. E. W., C.B., C.B.E., D.S.O., M.B.O.U.	Pinewood, Butts Ash, Hythe
1950	Venning, Mrs. E. L.	,, ,,
1950	Venning, Miss E. J. L.	,, ,,
1955	Vesey-Fitzgerald, Mrs. D. L.	30 Browning Avenue
1955	Walker, Mrs. L. W.	14 Alyth Road
1952	Walls, R. R., M.A., B.SC., F.G.S.E.	White Lodge, 9 Woodside Road, Parkstone, Poole, Dorset
1951	wWard, W. S.	44 Lesser Avenue, Clapham Common, London, S.W.4
1952	Warden, Miss F., M.C.S.P.	Flat 3, 69a Seamoor Road, Westbourne
1941	Watson, Miss G. V.	Manor Lodge, 20 Manor Road
1941	†LWVWatt, Mrs. W. Boyd, F.Z.S., M.B.O.U.	52 Wimborne Road
1946	Watts, Miss N. E.	3 Dunbar Road
1936	Weekes, Mrs. M.	3 Rotherfield Road, Boscombe
1947	West, Miss G. M.	The Knapp, Studland, Dorset
1957	Western, Mrs. A. M.	7 Midland Road, Winton
1957	Westwood, Miss J.	7 Landseer Road, Westbourne
1924	Whitaker, Miss E. M.	22 Somerset Road, Boscombe
1924	Whitaker, S. E., P.A.S.I.	22 Selwood Road, Addiscombe, Croydon
1951	wWhite, Miss C.	33 Manor Road, Bexhill-on-Sea
1951	White, Miss H. A.	Little Place, Harbour Road, Southbourne
1931	AWhite, S. J.	7 Gilbert Road
1955	Whittle, W. L., M.I.M.E., M.I.F., F.G.S., F.R.A.S.	31 Elgin Road, Parkstone, Poole, Dorset
1955	Whittle, Mrs. L.	,, ,,
1955	Williams, Mrs. G. E.	2 Belmont, De Maulley Road, Canford Cliffs
1952	Williams, P.	Woodend, Forest Corner, Ringwood
1952	Williams, Mrs. W. M.	,, ,,
1957	Williams, W. R.	13 Strouden Avenue
1957	Williams, Mrs. A. J. B.	,,
1942	†vWilliamson, F., F.R.HIST.S.	24a Rushton Crescent
1956	Wingate, Mrs. M. M.	37 West Cliff Road, Bournemouth West
1950	Winter, W. P., B.SC.	Latimer House, 27 Horsa Road
1951	Winter, Mrs. W. P.	,, ,,
1956	Wise, Mrs. B.	55 Namu Road, Winton
1950	Wiseman, Capt. L. G., O.B.E.	Avon Private Hotel, 4 Chine Crescent Road
1956	Witherby, R. B.	9 Commercial Road, Parkstone Poole
1948	AWood, Miss B., B.SC.	4 New Park Road, West Southbourne
1951	wWood, Mrs. L.	The Oaks, Sawbridgeworth, Herts
1950	Wood, Miss L.	3 Lonsdale Road
1956	Wood, T. E., M.A., LL.B.	12 Chine Crescent Road
1957	Woodger, Miss M. J.	70 Brackendale Road
1903	*†ovWoodhouse, W. J., A.C.P., M.I.H.	29 Twynham Road, Southbourne
1957	Woodhouse, Mrs. D.	,, ,,
1953	Wootton, Miss E. M.	Oakholme, 22 Elgin Road
1949	Wray, D. A., M.SC., PH.D., F.G.S.	42 Canford Cliffs Road
1949	Wray, Mrs. A.	42 Canford Cliffs Road
1956	Wray, Miss J., S.R.N.	,, ,,
1957	Wright, Mrs. R. L. C.	The Bassetts, Knyveton Road
1946	Wycherley, Mrs. L.	40 Littledown Avenue, Queen's Park

Obituary

Bernard Gorton M.R.C.V.S., M.P.S.

We regret to record the death of another member of the Society who was of long standing, in the person of Mr. Bernard Gorton.

Mr. Gorton joined the Society in 1927 and was for many years an extremely active and useful member in many branches of the Society's work.

He early became a member of the Council and over many years pursued a steadfast desire to promote the welfare of the Society. He frequently meticulously reminded that Body of Rules and Motions that had frequently been apparently overlooked, and his genial personality and strong sense of humour attracted many friends. He retained office on the Council until ill health compelled his enforced absence.

During his membership he was a Chairman of Sections and gave numerous lectures and demonstrations in the realms of animal anatomy, pathology and microscopy and these often attracted considerable interest. He has presented to the Society his very extensive collection of pathological and histological micro slides of his own preparation.

He qualified as a M.R.C.V.S. in 1910 and gained the extra qualification of M.P.S.

During the First World War he joined the Royal Army Veterinary Corps and saw service in Ireland and later with a Mobile Unit in France where he rendered signal assistance.

For several years he was a Veterinary Surgeon to the London Zoo and continued in a private capacity in Bournemouth until his death.

He was made an Honorary Member of the Society in appreciation of the several services he rendered during his many active years.

W.J.W.

BOURNEMOUTH NATURAL SCIENCE SOCIETY

Summary of the Accounts for the Year ending 30th September, 1957

1956			Receipts	£	s.	d.	£	s.	d.
534	2	6	Subs. to Sept. 30th, 1957 ...	541	12	6			
15	0	0	Subs. to Sept. 30th, 1958 ...	50	12	6			
—			Subs. to Sept. 30th, 1956 ...	3	5	0			
50	8	3	Covenant Tax Refund ...	—					
							595	10	0
			Rents, etc.						
100	0	0	Royal Empire Society ...	143	15	0			
64	0	0	Camera Club	64	0	0			
—			Other Accommodation ...	35	0	0			
17	4	6	Hire of Hall, Lawn, etc. ...	9	11	6			
5	13	4	Royal Empire Society, Gas Refund	7	5	1			
2	0	4	Telephone	5	18	0			
7	6	9	Sundries	9	16	3			
							275	5	10
32	0	0	Garden Party	27	16	11			
10	11	11	New Year Party	9	11	0			
12	11	9	Teas (net)	33	8	6			
21	3	7	Field Meetings	16	8	3			
							87	4	8
25	0	0	Donations				27	10	0
			Total of Ordinary Receipts				985	10	6
77	3	4	Interest on Investments ...				90	15	1
—			Interest (Income Tax refund to March, 1957)				32	15	11

1956			Payments	£	s.	d.	£	s.	d.
1	18	8	Refund to Hon. Treasurer				—		
155	9	2	Rates				170	19	4
49	18	3	Maintenance				57	15	5½
30	18	3	Insurance				33	14	0
105	13	6	Caretaker, Wages and Insurance				120	11	4
11	3	4	Library				6	19	1
50	8	1½	Garden and Maintenance	69	12	5			
5	5	11	Coal	25	14	5			
68	2	2	Electricity	59	15	3			
140	11	5	Gas	110	13	5			
4	16	9	Water	4	10	6			
							270	6	0
74	3	2½	Printing and Stationery ...	58	19	9			
53	14	0	Proceedings	44	7	0			
37	17	2	Postage	32	1	9½			
19	3	7	Telephone	18	16	4			
							154	4	10½
1	9	1	Museum				1	4	4
10	6	0	Subs. to other Societies ..				10	6	0
8	2	11	Sundries				26	12	9
			Total of Ordinary Payments				852	13	2

Receipts other than Ordinary

		£ s. d.	£ s. d.
	Gratuity to Mrs. Freeth ...	8 13 0	
	Sale of old Epidiascope ...	21 16 6	
	Donation Mr. Bury to complete purchase new Epidiascope	16 0 0	
	Insurance refund—repairs to Gas Boiler	23 9 0	
			69 18 6
19 9 1 (1955)	Balance in hand at Bank 30.9.56	68 8 9	
	Cash in hand	6 0 7	
			74 9 4
			£1253 9 4

Payments other than Ordinary

		£ s. d.	£ s. d.
	Gratuity to Mrs. Freeth ...	10 0 0	
	New Epidiascope	45 15 11	
	Gas Boiler repairs ...	23 9 0	
	Separation Elec. Supply, Domestic — other Supply — W.B.D. ...	62 1 0	
90 4 6	Installation Gas Heater Circulator	94 2 6	
	Canopy at rear of Building	61 7 6	
			296 15 11
	Balance at Bank, 30.9.57...	100 9 6	
	Cash in hand	3 10 9	
			104 0 3
			£1253 9 4

We have examined the above accounts with the Books of the Society and the Vouchers for payments and certify the same to be correct.

F. OGDEN
B. C. CUNDALL } *Hon. Auditors.*

Bournemouth, 3rd October, 1957.

H. C. MAYO, *Hon. Treasurer.*

ARCHÆOLOGICAL RESEARCH FUND (Deposit Account)

	£	s.	d.		£	s.	d.
Balance at Bank, 30.9.56	11	13	0	Balance at Bank, 30.9.57	12	0	4
Interest, 30.9.57		7	4				
	£12	0	4		£12	0	4

DEPOSIT ACCOUNT

	£	s.	d.		£	s.	d.
Balance at Bank, 30.9.56	29	0	0	Balance at Bank, 30.9.57	416	11	11
Legacy—Miss Elinor Fox-Hawes	200	0	0				
From Library—Sale of various proceedings Royal Society and Transactions of Linnean and other Societies	185	8	7				
Interest, 30.9.57	2	3	4				
	£416	11	11		£416	11	11

FIELD EXCURSIONS ACCOUNT

	£	s.	d.		£	s.	d.
Cash in hand, 30.9.56	4	12	7	Expenses Field Outings	3	5	2
Surplus from Coaches, etc.	27	6	8	Transfer to General Account	16	8	3
				Cash in hand, 30.9.57	12	5	10
	£31	19	3		£31	19	3

LIBRARY ACCOUNT

	£	s.	d.		£	s.	d.
Balance at Bank and in hand, 30.9.56	13	0	4	Librarian's Expenses	11	10	11
From Hon. Treasurer	6	19	1	Library Maintenance	12	8	3
Sale of Books and Periodicals	23	0	6	Balance at Bank and in hand, 30.9.57	19	0	9
	£42	19	11		£42	19	11

PHOTOGRAPHIC ACCOUNT

	£	s.	d.		£	s.	d.
Balance at Bank, 30.9.56	26	18	7	Hire of Films	22	17	11
Subscriptions to Ciné Films	25	11	0	Equipment, etc.	18	9	1
Projector hiring fees	8	7	6	Postages, etc.		4	5
				Balance at bank, 30.9.57	19	5	8
	£60	17	1		£60	17	1

INVESTMENTS

	Cost			Approximate Value, 30th Sept., 1957		
£ 500 4% Defence Bonds	500	0	0	500	0	0
£1000 3% British Transport Stock, 1978/88	775	4	0	600	0	0
£1000 4¼% British Electricity Stocks, 74/79	992	1	6	800	0	0
£ 500 4¾% County Borough of Bournemouth Mortgage Loan...	500	0	0	500	0	0
	£2767	5	6	£2400	0	0

Council's Report for the year ending September 30th, 1957

The Society's membership on September 30th, 1957, was 448. The number of new members elected was 63 and resignations for various reasons 93. In addition the Council has to record with great regret the death of the following members:—Mrs. E. Brimicombe, Mr. B. Gorton, Mr. J. A. Griffin, Sir F. Keeble, Mrs. E. M. Legat, Mr. E. C. Morton, Mr. H. Rounthwaite, Mr. J. Rushton, Miss F. R. Tanner, and since the 30th September, Mr. Risdon Bennett.

The President for 1956-57, Mr. A. W. Legat, M.Inst.C.E., delivered his presidential address, "The Development of the Thames", to a large and appreciative audience on October 13th, 1956. A summary of the address was printed in the Proceedings for 1955-56 and full copies are available in the Library.

The Society's activities were maintained at their usual high level of varied interest and included 51 lectures, 53 field meetings, 11 club days, 8 Cine programmes and a three-day tour to Hereford.

The equipment has been brought up to date by the introduction of the latest pattern epidiascope, and printed material and illustrations can now be projected from the projection room instead of from the body of the hall. The Society is indebted to Mr. H. Bury, not only for initiating this greatly appreciated improvement, but also for providing funds to defray the cost, another example of his devotion to the Society over 35 years.

The Council wishes to extend its warmest congratulations to Mr. Bury, who recently celebrated his 95th birthday.

The scientific activities of the Society are made doubly attractive by the efforts of so many to provide for the enjoyment and cultural facilities for all members. The same excellent service has been provided by the ladies Tea Committee, who are to be congratulated on the successful handling of the after lecture teas and the major occasions of the New Year and Garden Parties.

The grounds with their well-kept lawn and gardens continue to be a credit to the Garden Committee, and outside requests from time to time for permission to visit them are an indication of the the success of their efforts.

The valuable work of the Hon. Librarian, his assistant and Committee has been greatly appreciated, and thanks are due to them for the facilities provided and made use of by so many members. The comprehensive collection of books on scientific subjects is kept up to date by the addition of new publications. Journals of other British and foreign scientific societies are always available.

The Society's valuable collections have been preserved in good order and excellent condition by the work of the Hon. Curator. A major work has been the re-labelling of the specimens in the large and comprehensive mineral collection.

The excellent series of lectures and excursions has been made possible by the combined efforts and contributions of the Chairmen of Sections, Programme Secretary, Excursion Leaders, Lecturers and Projection Panels, who have so generously given the benefits of their special knowledge and experience.

The property and buildings of the Society at 39 Christchurch Road continue to be maintained in good condition and repair, consistent with good management and economy. The Society is fortunate in having the services of Mr. A. J. Butcher as Hon. Architect; his expert knowledge and experience have been of great value and are gratefully acknowledged.

It would be impossible to enumerate all the individual contributions by members to the smooth running and successful work of the Society, and sincere thanks are extended to all who have so generously and materially helped. Names of Chairmen and Officers are not generally mentioned as they are given in the list of Officers and Council.

The events of the year have been sadly overshadowed by the death of Mrs. E. M. Legat, the wife of our President and a valued member and friend of the Society. This is indeed an occasion where words are inadequate to express our sorrow and sympathy. The courage with which Mr. Legat has continued to carry out the duties of his office in the face of such tragic circumstances has been an inspiration to us all.

The Council has also sustained a sad loss by the death of Life Member Mr. B. Gorton, who has been a loyal and devoted member of the Society for thirty years.

The Council regrets to report that Mr. W. J. Read was obliged for health reasons to resign his duties as Chairman. He was succeeded by Mr. W. S. Brown.

For many years the Society has benefited from the publicity obtained for its activities by the valuable work of Miss Keene as Press Secretary. Her resignation has been received with regret and the Council wishes to express sincere thanks for all her work, which has been greatly valued and appreciated.

Mr. J. H. Murgatroyd has unfortunately been obliged to resign, being unable to attend. His valuable work as Chairman of Section, Lecturer and Hon. Editor is acknowledged with grateful thanks. He has been succeeded as Hon. Editor by Mr. J. H. Bailey and as Chairman of the Microscopy Section by Mr. W. L. Whittle.

The year has been attended with varied fortune, but emerging undimmed from it are the traditions of the B.N.S.S. of cultural advancement, through sharing of knowledge with sympathy and understanding.

Reports of Sections for the year ending September 30th, 1957

Library

The Society is grateful for specially generous gifts to the Library, viz. a set of 25 volumes of the 1947 Edition of the Encyclopaedia Britannica from the late Mrs. E. M. Legat: over 100 books from the late Mr. Trayfoot: a very nice hearthrug from Mrs. Read: and a useful oil heating stove from Mr. A. W. Legat.

Books have also been presented by Miss A. K. Harding, Miss V. G. Hayley, Miss U. M. Ogle, Miss Penrose, Miss Pressley, Professor J. Cameron, Major C. L. Cooper-Hunt, and Messrs. W. S. Brown, H. Bury, E. Chambers, H. V. Dacombe, H. Rounthwaite and J. F. Stray. The Society thanks them accordingly.

Mr. H. Bury, Dr. E. D. Fountain and Miss Penrose are kindly continuing to contribute certain periodicals, as stated in previous Proceedings, and Mr. W. L. Whittle is also contributing The Observatory, The Monthly Notices of the Royal Astronomical Society, The Journal of the British Astronomical Association and the Quarterly Journal of the Geological Society.

The Library Committee were able to pay into the Society's funds over £200, which had been realised from the sale of old Proceedings and Transactions of various Societies and some redundant books.

Ten modern books have been purchased, including Andrade's "An Approach to Modern Physics" and Loewenfeld's "Britain's Wild Larder".

A. A. FOYLE.

Museum

During the past year work has been concentrated on relabelling the Crallan collection of minerals, which contains many hundreds of specimens housed in two cabinets with a total of twenty-four drawers. In this work the Hon. Curator has had valuable help from Mr. G. E. Caswell. The whole collection has now to be re-arranged under the latest scheme of classification used in Rutley's Elements of Mineralogy, 24th Ed. 1953.

There are other collections in the Museum which require overhauling in the same way as the minerals and any help would be gratefully received.

Mrs. A. Brett has helped in keeping glazed cabinet drawers clean.

F. WILLIAMSON.

Garden

The Committeee have to thank Mrs. Barker for the gift of three rose trees and Mrs. Mayo for plants.

Two large sycamore trees have been felled and in the space thus cleared it is proposed to plant a few more suitable trees that are to be presented by Mr. A. W. Legat and other friends.

The lawn is greatly improved as a result of care and attention by the Chairman and good work has been done in the garden by a few of the members. More help is badly needed and it would be greatly appreciated if any member willing to assist would attend on Wednesday mornings when the Committee may usually be found working in the garden.

W. CHOMÉ.

Archaeology and History

On October 30th, 1956, Mr. W. L. Whittle, F.G.S., F.R.A.S., gave a lecture on "Nostell Priory", a National Trust property near Wakefield, Yorkshire, and was able to relate many personal reminiscences from his long connection with the place as manager of Nostell Colliery.

This was followed on November 21st by Mr. W. A. Stinton, whose lecture, "Cornish Quest", dealt with the prehistoric remains and was illustrated, in a way never before attempted, by means of colour photographs specially taken by himself.

On January 24th, 1957, Lt.-Col. A L. Paris introduced a most intriguing subject in a lecture entitled "Did Vespasian land at Hengistbury?" He made out a very plausible case and provoked much argument.

Mr. W. S. Brown, B.Sc., was to have given a lecture on February 28th on "Prehistoric Cave Drawings" but unfortunately he was unable to do so owing to indisposition, and in his absence the lecture was read by the Chairman of the Section.

Another lecture on "Prehistoric Man" followed on March 21st by Mr. W. L. Whittle, F.G.S., F.R.A.S., who described in considerable detail a conference on prehistory which he attended in Yugo-Slavia shortly before World War II.

Mr. T. H. Bickel spoke on "Old English Household Life" on April 27th and illustrated his subject with a fine collection of lantern slides.

The lecture season was brought to a close on May 24th by Mr. S. E. Whitaker, P.A.S.I., on "The Development of Medieval Vaulting", illustrated by excellent slides from the lecturer's own photographs.

The only excursion exclusively devoted to this Section was run to Avebury on July 16th. Many important prehistoric remains were seen, viz.—Old Sarum, Woodhenge, The Sanctuary, Silbury Hill, Kennet Avenue, Avebury Stone Circle, etc., Beckhampton Long Stones and Stonehenge. This is without doubt the finest prehistoric tour in Great Britain and embraces three of the most notable prehistoric monuments in Europe.

On September 10th a joint excursion was made to Portland Bill, etc. with the Geology Section and was well attended by 67 members. With other Sections visits were paid to Cirencester and Chedworth Roman Villa (Leader—Mrs. E. M. Cooper) and to Breamore Church and Mizmaze (Leaders—Mrs. and Miss Haines).

F. WILLIAMSON.

Astronomy

Professor F. O'B. Ellison, M.D., F.R.A.S., opened the lecture programme in October with a talk on "Mars", which had been in opposition during the preceding months at low altitudes in Europe and bad conditions for seeing. The lecture was illustrated by a good series of plates taken at the Pic du Midi and in South Africa, including a striking colour photograph, the first to be exhibited.

In December the Chairman spoke on "Photography of the Galaxies", showing photographs of those of our own local group recently taken by M. Vaucouleur in the Southern Hemisphere, using the photo-electric cell giving an improved resolution. Photographs of the colliding galaxies which are strong radio transmitters were also shown.

In January Mr. W. H. Day, F.R.A.S., exhibited a simple dial apparatus of his own construction, by the use of which the time on a clear night could be found fairly accurately from the position of circumpolar stars. The following month Mr. W. L. Whittle, F.R.A.S., F.G.S., lectured on "The New Look" and compared the work of the Hale 200″ telescope with that of the 100″ instrument at Mount Wilson and illustrated his lecture with a fine collection of photographs taken by each, some of which were shown for the first time in England.

In March the Chairman read a paper on the "Tercentenary of Edmund Halley", describing his pioneer work in gravitational astronomy, navigation, cartography and terrestrial magnetism, beside which his work on the cometary orbits was a 'personal recreation'.

On August 27th a joint excursion to Sidmouth, etc., was made with the Geology Section and through the kindness of Dr. Wray and at the invitation of the Superintendent (Mr. Barber) 25 members had the privilege of visiting the Sir Norman Lockyer Observatory at Salcombe Regis (University of Exeter), whose astrophysical work is world famous. The President expressed the thanks of the party to Mr. Barber.

W. P. WINTER.

Botany

Interest in the Botany Section's activities has continued throughout the year. During the winter months there were five lectures, viz.—"Spices and Man" by Mr. E. Chambers, F.L.S., another in his series on Economic Botany; "Wayside and Garden Flowers" by Mr. W. L. Whittle, M.I.M.E., F.R.A.S., F.G.S.; "Flowers of the New Forest" by Mrs. Goodhart of the Lymington Natural History Society, in which she delighted us with her beautiful colour transparencies; "Some Remarkable Kenya Plants" by Miss A. K. Harding, B.Sc.; and "Orchids, British and Foreign" by Mr. E. Chambers, F.L.S. Our thanks are due to these lecturers for so generously giving up their time in the service of the Society.

During the autumn of 1956 the Fungus Foray was held in Morden Park and the usual coach outing was made to the New Forest for Autumn Tints and was very well supported. The Misses Penrose again welcomed us to their garden and arranged a pleasant afternoon, for all of which we should like to take this opportunity of thanking them most sincerely.

Starting with the visit to Somerley Park at the end of March we have had 19 Field Meetings, including 4 by coach; all were well attended and we express our thanks to the various leaders. One coach outing, which proved most popular, was to Exbury Gardens, which we had not visited for several years, and we should like to thank the Head Gardener and his assistants for taking us round, and Brigadier F. E. W. and Mrs. Venning for so nobly entertaining such a large party.

Botanical Survey.

No organised outings were planned for the survey this year, but the Section's ordinary outing in June to Breamore was helpful, and good work has been done by individual members. We were asked by Headquarters to send all records to Cambridge by September 30th of this year. Further records will be accepted next year but the survey will close on September 30th, 1958.

B.N.S.S. results to date are as follows:—

Grid Squares	*Area*	*1957 Additions*	*Total*
40/19	Christchurch	11	560
41/11	Fordingbridge and Breamore	24	288
41/21	Bramshaw—Cadnam	No previous work done	215
41/10	Ringwood	(Mrs. & Miss Haines)	492

L. M. Child.

We are grateful to Miss Child for her work in connection with the Botanical Survey and for her exhibits in the Botany Room, which never cease to attract attention.

Plant records made during the year:—

Pulmonaria officinalis: two new localities, viz. Wootton Common and Brockenhurst Park.

Hottonia palustris: near the Lymington-Brockenhurst road. (Brigadier F. E. W. Venning).

Geum intermedium: near Brockenhurst.

Lepidium ruderale: and many aliens: reclaimed land at Mansbridge.

Sambucus ebulis: West Hill, Corfe. (Miss Ogden).

Leucojum aestivale: Wick Ferry.

Ornithogalum umbellatum: a dump near Wick Lane.

Alopecurus bulbosus: near Christchurch gas works. (Mr. Michael Proctor).

A. K. Harding.

Entomology

Very few records were received this year of the appearance of uncommon species of Lepidoptera, but several members commented on the late arrival of some of the Nymphalidae, referring in particular to the Red Admiral, Tortoiseshell, Peacock and Comma Butterflies.

The flowers of several varieties of Asters have been more than usually attractive to these sun-loving Butterflies.

During September Mosquitoes were more in evidence than usual, and incidentally I may mention that a lawyer telephoned to enquire if I would give evidence in a Court Case in which a resident having a pond in his garden was said to be encouraging the breeding of Mosquitoes to the annoyance of his next door neighbour. I did not accept the invitation.

In April last the writer gave a lecture on "Insect Foes", illustrated by four coloured Cine Films, and in September Mr. S. C. Scarsdale Brown, L.D.S., R.C.S., gave an interesting lecture, illustrated by Epidiascope, entitled "How to find Wild Life."

W. S. I. Cox.

Geography

During the past year there were seven lectures and three excursions, all of which were well attended. Mr. H. W. H. Tucker lectured on "Plymouth—a city which refused to die", Professor John Cameron, M.D., D.Sc., on "Vienna", Miss D. A. Finch, B.Sc. on "Rumania as I saw it" and Mrs. E. M. Cooper on "The Cotswolds and Wye Valley", which had been visited by a party of members during the previous summer. Mr. E. Chambers, F.L.S., gave an interesting lecture on "Venezuela, land of Bolivar" and co-operated with the Chairman in a talk on the important geographical subject of "Making and using Maps". The Chairman visited the Norwegian Arctic during the summer and gave members an account of her journey.

Field excursions were organised to the Avon and Nadder Valleys and, in conjunction with the Geology Section, to the Isle of Purbeck. An afternoon excursion was made to Poole to see the work at a shipyard, an iron foundry and a timber yard.

F. M. Exton.

Geology

In the past year Mr. W. A. Stinton gave us an interesting lecture on "Cornish Granites" and two lectures were given by the Chairman of the Section. The first was an account of the geology and physiography of the Dorset coast, and the later one on petrography entitled "Examining rocks with a microscope". Mr. Stinton prepared admirable colour slides for two of these talks, and for that on petrography we were indebted to the President (Mr. A. W. Legat) for the loan of Nicol's Prisms, Mr. W. L. Whittle for an excellent series of rock slides, and Messrs. Troughton and Sims, of York, for the loan of a Cine Film on the petrological microscope.

Three joint coach excursions were also arranged in the past session and each was well attended and proved highly successful. In May we visited places of geological interest in the Isle of Purbeck, and later visits were made to Sidmouth and the Isle of Portland.

D. A. WRAY.

Microscopy

During the Season 1956-57 the Section was re-introduced to be of assistance to all the Sections of the Society.

The Society owns several microscopes and a large collection of microscope slides. Any assistance by members interested in the Section will be appreciated.

Thanks are due to Mr. W. J. Read and to Mrs. L. Wycherley for presenting material for collecting specimens and making slides. Mrs. D. M. Burrows presented a collection of microscopic sections of rock, minerals, plants, etc., as a gift from E. Jackson-Lawrie, Esq., to the Society.

The Section has been assisted by the inclusion of films using the microscope to illustrate many of the interesting subjects in the Cine Subscription Programmes. On February 23rd, 1957, Mr. W. A. Stinton illustrated parts of his lecture on Granite by microscopic sections. On March 23rd Dr. D. A. Wray lectured on the use of the microscope in examining rock sections. This was illustrated by means of two Cine Films and a very ingenious micro-projector using "Polaroid" material; the micro-projector proved to be an excellent method of using polarised light and produced beautiful effects when the rock sections were projected on to the screen.

On April 6th, the Chairman of the Section gave a lecture on the Microscope, illustrated by two Cine Films obtained by Mr. W. A. Stinton and microscope slides which were projected by the addition to the lantern slide of a Selenite crystal plate which greatly enhanced the colours.

WM. L. WHITTLE.

Photography

During the past year ten lectures were given, eight of these, including one Cine Film, being in colour and two in monochrome. All were well attended. They comprised two—"Wanderings with a Colour Camera" and "Madeira in Colour"—by Mr. A. W. Legat, M.Inst.C.E.: "Adventures with a Camera" by Mr. R. T. Bruton: "Journey to Dubrovnik" by Mr. R. J. Pearce, A.R.P.S.: "Ramblings of a Country Bumpkin" by Mr. A. E. V. Boggust, illustrated by the lecturer's Cine-Colour Film: "Colour Slides with Comments" by Mr. W. A. Stinton: "The Lower Avon Valley" by Mr. W. J. Read, M.Sc., F.R.I.C.: "West of the Severn" by Mr. R. B. Cruse: "Purbeck to Snowdonia" by Mr. Ernest Bristowe: and four fifteen minute lecturettes, illustrated by their own colour slides, by Mrs. C. M. Lanning, Dr. T. Marshall Bell, B.A., Mr. R. J. Adams and Mr. D. J. Dudley.

The thanks of the Society are tendered to all these, four of whom were visiting lecturers, and to the members of the Projection Panel who worked with their usual efficiency.

New volunteers with twenty interesting colour slides are required in order to make up the next lecturettes.

An innovation last autumn was the introduction of a photographic discussion group confined to members working in colour. This was a informal gathering of a few enthusiasts who met about once a month to discuss their problems and to exchange methods. It proved so popular that it is hoped to continue the meetings during the coming winter.

It has always been the endeavour of this Section to place the emphasis on good photography.

The monthly Subscription Cine Film Programmes were continued during the winter for their third season under the direction of Mr. A. W. Legat. They covered many branches of Natural Science and were much appreciated by the subscribing members. The Cine Projection Panel under the direction of Mr. H. K. Stanton gave their usual efficient service.

URSULA M. OGLE.

Physics and Chemistry

It can scarcely be questioned that this year 1957 will attain a high place in scientific history for the outstanding achievements it will have witnessed in both the physical and biological sciences. The International Geophysical "Year" (which will be of 18 months) opened in July and has already signalised events of world importance in rockets and satellites; the Chemistry Section of the British Association in September discussed the newly prepared tenth trans-Uranian element, christened Nobellium; extraordinary activity has been manifested in technology, particularly in electronics and in the establishment of nuclear energy plants in Britain; in Biology researches of the first magnitude have been initiated and reported on the relation which has been proved between chemistry and living matter. The call has gone out for a vast extension in scientific and technological teaching and for the output of even more and more trained men and women from colleges and universities.

An attempt has been made during the Society's year (October to September) to reflect these developments and trends, in the activities of this Section. In January, Mr. F. C. Whitelock, B.Sc., Deputy Head of Poole Grammar School, gave an admirable lecture on "Training the young Scientist", and in March, Mr. J. F. Stray related with great interest his experience and work over forty years overseas as an engineer in Telegraphy with Cable and Wireless Ltd. This had already been preceded in November by a talk from the present writer on how Electrons were being put to technical work in ever new and exciting ways. Also in November we had a welcome return to our programme of Dr. Hugh Paul, M.D., D.P.H., who gave us the benefit of his distinction as an epidemiologist in an address on the place of insects in the spread of epidemic diseases.

The remarkably rapid advances in rocket and guided missile technique and tests during the year have brought the anticipated output of superstitious extravagances, and it was perhaps not unfitting that the topic of Flying Saucers was given an afternoon by this Section in January. A new departure was attempted during September, in the form of four Friday meetings of the Section for the study of the six broadcasts given in the Third Programme in February and March on the Chemical Basis of Life. The talks had been tape-recorded by Major C. L. Cooper-Hunt, M.A., who must be thanked in addition for playing them back at these meetings. The "Listener" reprints were also made available for closer study by the initiative of Mr. G. Holroyd, who projected them from the epidiascope.

H. E. CLARKE.

Zoology

Revived in March, 1956 this Section has, in its first complete Session ending September, 1957, made a full contribution to the activities of the Society. Brief details of this are given below.

The following illustrated lectures were well attended: and although on each occasion our appreciation was fully expressed, we may here appropriately record our thanks to the lecturers, both members and visitors, some of whom had travelled considerable distances in order to address us.

"Making Friends with Birds" by Mr. A. F. Park, F.R.P.S.
"Life beneath the Sea" by Mr. W. S. I. Cox, F.R.E.S.
"Nature's Camouflage" by Mr. W. A. Chaplin, A.R.P.S.
"The Biology of the Badger" by Mr. John Sankey, B.Sc., F.Z.S., F.R.E.S.
"The Migration of Animals" by Mr. Henry Bury, M.A., F.L.S., F.G.S.

FIELD MEETINGS.

These have always been a feature of the Section between Spring and Autumn, but in the Session under review a major extension was made to the Programme. Field Meetings were arranged throughout the winter, thus covering all the months of the year. This gave a total of twenty-three meetings and included three arranged jointly with the Botany Section. The extension of outdoor activity has been welcomed by enthusiasts, and on fine days we have been joined by other interested members. The winter period has, of course, its own special seasonal rewards among the birds in the harbour and at the edge of the tide, and the meetings will be continued throughout the new Session.

Although no exceptional rarities have been seen, a sufficient variety has occurred regularly, with attractions such as Golden Oriole (Holmsley); Whooper Swans (Stanpit and Littlesea); Reeve, Curlew Sandpiper and a flock of over 1500 Dunlin (Stanpit); and the Whitefront Geese in the Avon Valley to heighten interest.

It is perhaps appropriate here to record the fact (not, for obvious reasons, made public at the time) that Great Crested Grebe nested within eight miles of Bournemouth this season—a rare occurrence in recent years. After evidence of interference with the nest and eggs the writer, assisted by another member, and enthusiastically supported in watching by those on whose water the birds nested, had the satisfaction of seeing the young successfully reared. When therefore, at the initial autumn meeting, a first winter female G. C. Grebe was watched in Brand's Bay there was keen interest; but without ring identification scepticism is always wise.

H. V. HARRIS.

Professor John Cameron, M.D., D.Sc.

The Council is pleased to congratulate Professor Cameron on his recent election to membership of the New York Academy of Sciences (formed 150 years ago). Comparatively early in his career he became a charter member of the American Association of Physical Anthropologists and was recently invited to attend their meeting at the University of Chicago to receive their thanks for his support during the early years of the Association. He regretted his inability to attend.

Special Announcement

The President (Dr. D. A. Wray) desires to announce that he will contribute an article on **Geology and the International Geophysical Year** for publication in the next issue of the **Proceedings.**

Presidential Address

The Evolution of our Southern Coastline

By D. A. Wray, Ph.D., M.Sc., F.G.S.

(Delivered before the Society on 12th October, 1957).

INTRODUCTORY

In precisely three weeks time, ladies and gentlemen, our Society will have reached its 54th birthday, for it was on the 2nd November, 1903, that the inaugural meeting took place, the first President being the Mayor of Bournemouth (the late Alderman Beale).

Bournemouth has indeed witnessed vast changes since those early days. The wide majestic sweep of our lovely bay, extending from Hengistbury Head to Poole Harbour, was then in its natural state, unencumbered by promenades, undercliff drives, beach huts, and the like. Rustic residential villas still adorned the western end of the Westover, while many of the so-called modern amenities were non-existent; and I suppose we plebeian members of the Society would have travelled hither for such a meeting as today's by the newly established electric trams plying between the Square and Boscombe; while the more affluent, I presume, would have hired a fly, hansom, or may be a growler from one of the cab-ranks in the town.

But I think perhaps the most oustanding event in the history of the Society took place in 1920, when our far-sighted predecessors acquired this handsome building, with its museum, library and beautiful gardens, the envy, I need hardly add, of many of our provincial Science and Natural History Societies.

The remarkable scientific distinction and versatility of our early members is well reflected in the unique collection of photographs of past Presidents which most of you have doubtless scanned and admired, and which are now displayed in the reference library upstairs.

Among these I well remember Ray Lankester, a dour Scot, a rugged figure of massive proportions, and, by common consent, the leading zoologist of his time: Sir Arthur Smith Woodward, the eminent palaeontologist: Sir Jethro Teall (under whom I served for several months), a pioneer in British petrography: Col. Sir David Prain, the famous botanist: and Dukinfield Henry Scott, twice President of our Society, and one of the kindliest men I ever met. His father and elder brother, George and Gilbert Scott respectively, the well-known architects, perhaps overshadowed in the public eye his pre-eminence in the study of fossil plants. Nor must I overlook those two fellow Yorkshiremen, who spoke their native Doric tongue with such characteristic forthrightness; I refer, of course, to the late Sir Frank Dyson of Bradford, former Astronomer Royal, and Francis Bower of Ripon, a plant morphologist of international renown.

Mr. W. J. Woodhouse, Mr. Henry Bury and Professor John Cameron are happily still with us, and how much the Society owes to their devoted services over many years is appreciated by us all.

In looking over the list of former Presidents, 43 in all, one is struck by the fact that only once has a lady-member been elected to this exalted position. Mrs. Boyd Watt (whom we are all happy to have with us this afternoon) filled this post with rare charm and distinction seven years ago, but I feel sure the Council are by no means unmindful of the invaluable assistance and guidance we owe to so many of our accomplished lady-members.

Since the Society's foundation the progress in every branch of science has been phenomenal. Less than half a century ago the late Lord Kelvin, doyen of late Victorian science, told us that the atom was indestructible, yet within twenty-five years, Rutherford and his Cambridge colleagues succeeded in disintegrating and splitting it; while the erection of an atomic reactor station on the lone Dorset heathlands, less than fifteen miles from here, vividly indicates how far we have travelled in this particular field of human endeavour.

It was also in the very year of this Society's formation that two cycle mechanics in North Carolina soared into the air for less than a minute's duration on a so-called flying machine, and opened up yet another chapter in man's scientific achievements. Within the next twenty years, you may remember, an intrepid Yorkshire girl startled the whole civilised world by flying alone and unassisted from Croydon across continents and oceans to Port Darwin in Australia. Today air travel is a normal mode of human transport, while the remarkable events of the past week would appear to suggest that we may well be on the threshold of great and possibly revolutionary advances in the field of inter-planetary travel.

Many of you will also doubtless recall that it was in the vicinity of Bournemouth Pier and at Sandbanks that the late Senator Marconi conducted his researches, the Haven Hotel being the first station in the world to receive long distance wireless messages some fifty-three years ago. Radio, television and other results of these investigations are today familiar to everyone.

Progress in the so-termed natural sciences has been equally remarkable in its effects on the life of the community, though to the non-scientific layman it may not appear quite so obvious or spectacular. Yet the field of thought and inquiry opened up for such a Society as ours has been enlarged and widened to an extent quite undreamed of by its founders and early members.

OUR SOUTHERN COASTLINE

For the past half century my work and interests have largely been in the realm of field-geology; and as we have close at hand a coastline of the highest geological interest, I thought it may not be altogether inappropriate if I tried to show you, this afternoon, some of its unique structural history and development. In this I am extremely fortunate in having in Mr. Stinton (our popular Secretary) a friendly co-worker who has so splendidly seconded my efforts, and gone to endless trouble to prepare a unique and magnificent series of colour slides to illustrate the subject. With such excellent material at my disposal, my task has indeed been a light and a happy one.

Two main factors have been dominant in the evolution of these cliffs; the first I shall speak of as the **Great Transgression,** and the second as the **Great Alpine Earth-folding Movements.** Let us deal first with the Great Transgression.

THE GREAT TRANSGRESSION

In order to understand what we mean by a transgression just try and imagine what would happen if the sea-level rose say three or four hundred fathoms and submerged much of Britain. A blanket of silt would be laid over the whole area, completely obliterating the present land-surface; and whereas in one place, such as Devon, it would rest on red sandstone; around Dorchester it would rest on the chalk; and around Bournemouth and Poole, as you are well aware, on tawny brown sands. Now this is precisely what we see beneath the chalk in the cliffs along our south coast. We have indeed here a very ancient land surface; one which we geologists think is no less than sixty million years old, and I now propose we examine it in some detail.

Between Sidmouth in the west and Swanage in the east we have a very varied series of rocks exposed in the cliffs and if we examine them closely it will be seen that they have, on the whole, an easterly dip or inclination, and consequently the lowest and earliest formed lie to the west. They have also a total thickness of some six thousand feet, and consist of clays, limestones and shales, etc., which contain fossil shells, corals and other extinct marine organisms which bear witness to a gradually sinking sea-floor extending over an extremely long period of time.

Yet in many places the chalk, with the distinctive band of greensand at its base, can be seen resting upon the eroded and worn down edges of this varied succession of clays, limestones and shales. It is clear that this vast column of rocks, which underlies the chalk and greensand, was in the first place laid down and consolidated in a horizontal position. It would then appear to have been uplifted and raised above the level of the sea, but with a distinct tilt from west to east. This elevated region was then for vast aeons of time subjected to atmospheric weathering and erosion by natural agencies, such as rivers and the like; so that it was ultimately worn down to a peneplain, or nearly level surface.

The next stage was the eventual sinking and subsidence of the area beneath the waters of a clear, almost sediment-free sea, on the floor of which our chalk was formed. Chalk is made up of fine particles of lime including countless shell fragments, and like many of the calcareous muds or oozes forming in clear oceanic waters at the present day, contains innumerable shell casts of the minute lowly organisms belonging to the *Foraminifera* family. None of these modern limy oozes are forming at a rate of more than one foot in a century, so it is clear the thick chalk formation must represent a very long period of time.

In Swanage Bay the rocks underlying the Chalk and Greensand are sands and clays referred to by geologists as the Wealden Series. Similar sands and clays underlie the Chalk at Corfe Castle; while at White Nothe in Ringstead Bay, twelve miles to the west, the Chalk rests directly on the dark grey Kimmeridge clay. The transgression is particularly well seen here. Along the western escarpment of the Chalk at Eggardon and Askerswell the underlying formation is the oolitic limestone seen in the quarries at Loders and elsewhere; while to the west of Bridport, at Thorncombe Beacon, the strata underlying the Chalk and Greensand are the dark grey Lias clays and shales. At Golden Cap the same conditions prevail, whereas the notable headlands around Charmouth and Lyme Regis, such as Stonebarrow and Black Ven, are capped with the bright yellow greensand, standing out in marked contrast to the underlying dark coloured Lias clays and limestones.

Continuing westward to the Axe valley, we note the remarkable white chalk outlier forming the summit of Haven Cliff and towering above the red and grey marls below, the latter being still lower in the geological succession, and consequently much older than the Liassic rocks of Lyme Regis. Finally, in the Sidmouth and Branscombe districts, the cliffs of deep red coloured marl and sandstone have also a distinctive capping of white chalk in many places. In Ladram Bay, two miles south west of Sidmouth, a notable landmark is High Peak, the top of which is a small outlier of white chalk and forms the most westerly patch of this formation seen along the coast. Below are steep cliffs of deep-red coloured sandstones and marls, and at the foot of High Peak in Picket Rock Cove they have yielded jawbones and teeth of the huge extinct reptile-like *Labyrinthodont,* which lived in Triassic times.

Three years ago Professor W. B. R. King, F.R.S., President of the Geological Society of London, published in the Quarterly Journal of that Society, an interesting geological map showing the distribution of the various rock formations on the floor of the English Channel. This was based on the results of a large number of shallow borings made by a special type of borer, and the most remarkable feature it shows is the wide range of the Chalk extending as a continuous belt along the floor of the Channel. This chalk belt is seen to rest, or overstep, as we say, on to a very varied series of underlying strata. Thus twelve miles due south of the Eddystone Lighthouse it can be observed overlapping the Liassic and Triassic series of rock formations, and this is precisely the same relationship we have observed along our southern coastline.

THE GREAT TRANSGRESSION OF WORLD-WIDE SIGNIFICANCE

The Chalk is such a dominant rock, notably in Southern Britain, that one is inclined to think of it as peculiarly English; yet it is remarkably widespread for it extends from Northern Ireland across much of Northern Europe to Poland and Russia. It is also represented in Southern Europe and in North Africa, where much of the Sahara was under the sea at this time. In America the Chalk seas extended from Alaska to Mexico, and the same formation is found in places as far apart as Greenland and Australia.

Chalk contains only a negligible amount of arenaceous material; consequently it must have accumulated on the floor of clear sea, largely devoid of detrital sediments. It is also obvious that the eroded land-surface on which it rests, together with the bordering shores over wide areas, must have been worn down to a nearly level surface, indicating an erosive period extending over immense periods of time. Indeed it is recognised by geologists as marking one of the greatest periods of marine transgression in world history. Professor Leslie King, the eminent South African geologist, also considers that the origin and sculpture of the world's principal plainlands, notably those of India, Brazil, Australia and continental Africa, took place mainly in this period of profound erosion and denudation.

This epoch also marks an important stage in the succession and evolution of our animal and plant life. Thus in the underlying rocks occur such extinct and bizarre forms of life as the plesiosaurs or sea reptiles, the huge eighty-foot long deinosaurs, and the whale-like ichthyosaurs—a period described as the Age of Reptiles, while mammals were only represented by small and primitive marsupials. Yet in the period succeeding the Chalk era the mammals show a rapid development and almost completely replace these extinct reptiles as a dominant element in the fauna.

In the older rocks also, among the invertebrates, we find the ammonites and belemnites, or extinct forms allied to the cuttlefish or nautilus, remarkably prolific; whereas in the higher rocks they are largely replaced by more modern forms.

The changes in plant life are particularly striking; for whereas conifers and cycads were predominant in the earlier phase, immediately above this ancient erosion or land surface, flowering plants first appear and rapidly become the dominant type of vegetation throughout the greater part of the world.

THE GREAT ALPINE EARTH-FOLDING MOVEMENT

The earth movements we have hitherto been discussing were primarily those of uplift and depression of the earth's crust relative to sea-level; whereas in the second type the movement is essentially horizontal and tensional in character. Not only has the earth's crust been bent and buckled into folds, but huge areas or rock-masses have been thrust over one another by horizontal compressive forces of unimaginable intensity.

In this period, which long succeeded the formation of our Chalk and took place some thirty million years ago, many of the world's principal mountain ranges had their origin, including in Europe, the Alps, the Pyrenees, the Carpathians, and the Balkan Range; The Himalayas and island-festoons in Asia; and in America (where they are usually spoken of as the Laramide formation), the Rocky Mountains and the Andes.

This Alpine folding movement has played an important part in determining the physical features of southern England. Thus it was responsible for the saddles, upfolds or anticlines of the Weald, the Isle of Wight and Purbeck; and also for the complementary London and Hampshire basins or synclines. The axes of all these folds are orientated along an east and west direction, and the earth movements which produced them came from the south, for the folds are asymmetrical, having a steeper northern limb. They have been well described as "the outer ripples of the great Alpine earth storm".

But perhaps the most interesting and perfectly exposed of all the effects of this Alpine orogeny is to be seen along the Dorset coast between Gad Cliff and Durdle Door, where the sea has laid bare all parts of the structure from the core or crestal region to the vertical and overturned upper limb, in the vicinity of Man O' War Bay.

Around Worbarrow Bay, Gad Cliff, Mupe Bay and Lulworth Cove, the successive bands of Portland and Purbeck limestones, Wealden sands and clays, Greensand and Chalk have a notable dip or tilt in a northerly direction. In Stair Hole remarkable contortions in the Purbeck limestones, marls and shales occur, while as we pass westward into St. Oswald's Bay these varying bands of rock are again seen to be highly inclined. In Man O' War Cove, at the western end of the bay, they have been thrust into a vertical position and in some places overfolded. Here the crumpling of the rocks attained its zenith and Durdle Door is an almost vertical mass of Portland limestone, the opening in the door being determined by oblique joints intersecting the steep bedding planes. Hereabouts the forces of compression and folding must have been immense, for whereas at Swanage and Durlston Bay the distance between the Chalk and Portland limestone is some two and a half miles, at Durdle Cove they are only 130 yards apart.

Proceeding still further westward, a notable line of caves can be observed in the lower part of the towering chalk cliffs of Swyre Head and Bat's Head. These mark the eroded edge of a thrust or slide plane, over which the upper beds of chalk have been pushed by powerful earth-forces horizontally, and the rocks here are found to be intensely hard and recrystallised. The plane of the thrust forming the floor of the caves was ground into paste and re-cemented again, while the chalk-flints have been shattered and in places form a long drawn out trail of black powder resembling coal dust. Indeed the power and magnitude of the physical forces here displayed are without parallel among any other sections of the Chalk in Britain or Northern Europe.

FINAL EPISODE

Ever since the last upheaval of the land in Tertiary times, Southern Britain has been continuously subjected to a long and uninterrupted period of erosion and wearing down by atmospheric agencies extending over many millions of years. The gradual encroachment of the sea from the west along softer belts of rock produced broad inlets such as the English Channel and, to a lesser degree, the Bristol Channel; and two of the most striking physiographic features which today characterise our southern coastline are the Chesil Beach and Poole Harbour.

Chesil Beach, a string of pebbles eighteen miles long, is one of the world's most remarkable storm beaches and dates from the Pleistocene period when the greater part of Northern Britain was covered with extensive ice-sheets and glaciers some thirty thousand years ago. Poole Harbour lies in the lower part of the valley of the River Frome and at one time the river flowed in a broad wooded valley past Poole and Bournemouth and along the line of the Solent, entering the open sea between Portsmouth and Ryde. With the eventual breaching of the chalk ridge between the Needles in the Isle of Wight and Ballard Down in Purbeck, the soft sands behind were rapidly eroded away, producing the sandy shores at Bournemouth and drowning the lower reaches of the Frome valley around Poole.

SUMMARY

This afternoon, ladies and gentlemen, I have endeavoured to give you a few glimpses of the interesting vista of past events which are so vividly recorded in the rock succession of our southern coastline. This coastal belt extending from Poole Harbour to East Devon has great scenic beauty and charm, and where, other than in picturesque old Dorset, should we expect to encounter such attractive and quaint-sounding place names as Black Ven, Golden Cap, Durdle Door, Stair Hole, Arish Mell Gap, Emmett's Head, Dancing Ledges, Tilly Whim and Nine Barrow Down.

With comparatively small exceptions, it is a region largely unspoilt by man's many varied and manifold activities, and consequently it exhibits that matchless combination of harmonious form, line and colour, which Nature invariably achieves when her forces are at work, free and unhindered.

The numerous prehistoric circles, tumuli, lynchets and earthworks scattered over its slopes and adjacent downs will always attract the attention of the archaeologist and the historian; while its varied plant associations, its remarkable insect life and distinctive bird population must ever make a perennial appeal to the botanist, the entomologist and the zoologist.

The many types of land forms ranging from isolated stacks and headlands, coves and estuaries to shingle bars and storm-beaches fall within the province of the geographer; whereas we have seen how to the geologist (or student of earth history) this glorious coastline and scenic heritage of ours constitutes a veritable palimpsest, recording for us some of the more remarkable episodes in the evolution of this restless earth of ours, and how its varied rock-succession may well be compared to the pages of a great historical romance, and one of surpassing interest and infinite variety.

Some geographical aspects of the Arctic and Antarctic with reference to the International Geophysical Year

BY F. MARJORIE EXTON, B.A.

At the present time there is great activity in both the Arctic and the Antarctic as part of the I.G.Y. programme and for other reasons of great importance to man.

The Arctic is an ocean covered with pack and drift ice, practically surrounded by land which, except in Greenland and Scandinavia, is of low elevation. The winters are cold and dark, but in the intense and continuous sunlight of summer, temperatures often rise quite high and there is a considerable but stunted growth of many species of plants, while birds, animals and insects are abundant.

The polar lands of Alaska, Canada, Russia and Scandinavia have always supported a scanty population of fishermen, trappers and nomadic herdsmen, but the discovery of minerals such as iron in Sweden at Gellivara and coal in Spitsbergen, has led to the establishment of mining settlements in many areas.

The "top of the world" has become of great strategic importance with the U.S.A. and Canada facing U.S.S.R. across the Arctic Ocean. Along the north of the American continent the Distant Early Warning (D.E.W.) Line of radar stations has been built up at great expense and under difficult conditions to give warning of possible bombing attacks. However, all this may now become useless, almost overnight, with the Russian announcement of their inter-continental ballistic missile.

There is also great activity with the development of the Great Circle Polar air routes leading to the establishment of bases in such remote places as Thule in N.W. Greenland. The London-San Francisco Polar route was inaugurated in September, 1957.

The weather of the north temperate zones is largely determined by the position of the Polar Front, where the cold arctic air meets the warm tropical air and where cyclones originate. Therefore for many years meteorologists have been making observations in such isolated places as Bear Island, Jan Mayen and at "Alert" on Ellesmere Island, only 450 miles from the North Pole, to help in weather forecasting for land and sea areas and now also for the upper air conditions on the new air routes.

Thus the Arctic, in spite of its rigorous climate, has become very important and large numbers of scientists, technicians and engineers are working there to solve the problems raised by these new developments. Much of this is not part of the I.G.Y. programme, but is bound to be of great importance to man.

In the Antarctic, however, a purely scientific or adventurous spirit is all that would tempt people to go to this much less hospitable region.

Antarctica consists of a plateau about 10,000 feet high, with some lofty mountain ranges reaching as much as 20,000 feet. The continent is deeply cut into by the Ross and Weddell Seas, and the whole land is covered with a cap of permanent snow and ice, which in one place is known to be 1½ miles thick. Vast, heavily crevassed glaciers make their way to the coast between the mountain ranges and in many places an ice shelf fringes the land. This shelf is from 70 to 200 feet high and is very wide in the Ross Ice Shelf, which covers an area three times that of England. The position and extent of the shelf changes as great masses of ice break off to form the huge tabular ice bergs so characteristic of the Southern Ocean. The continent is also surrounded by an area of pack and drift ice which make approach very difficult even in the summer.

The altitude, the long dark polar winter and the low angle of the sun, result in very low temperatures being experienced—sometimes as much as 100°F below freezing point. One of the most unpleasant features of the climate is the very strong winds, caused by the intense anticyclone over the plateau from which the wind blows out and down the valleys with hurricane force.

Here there is no growing season for the temperature of the ground rarely rises above freezing point. There are no flowering plants and no animal life on land, although the surrounding seas, rich in plankton, teem with krill which are the food, not only of penguins and seals, but also of the mighty whales. Man cannot live here permanently for it is a dead land.

Before the last war, many daring ventures had been made into the interior and the South Pole reached, often with loss of life and always with great hardship, but Antarctica still remained almost unknown and not even the coastline had been accurately surveyed. Then in 1946, Byrd, with the help of radio, aeroplanes and many other mechanical aids, unknown to earlier explorers, led "Operation High Jump", which indeed filled in many blanks, for 4,000 miles of coast were mapped and many mountains and islands were discovered. The whole mighty expedition challenged the Antarctic but did not conquer it.

And now in 1957 the scientists of ten nations have again accepted the challenge and set up their bases for intensive observation of weather, the aurora australis, ionosphere phenomena and the study of the geology and glaciology of the continent.

New Zealand, with bases on McMurdo Sound and Cape Adare, is specially interested in weather observations, for storms, fine weather and drought conditions in their country seem to be closely related to the strength of the cold air current blowing from the plateau down a funnel 1,000 miles long. A party of their scientists will also study the geology of one of the strangest areas of Antarctica, in valleys of retreated glaciers, where fresh water lakes and streams are expected to yield a harvest of invertebrata and primitive botanical life.

From the New Zealand base on McMurdo Sound, Sir Edmund Hillary is climbing on to the plateau by the Skelton Glacier and hopes to meet Dr. Fuchs of the Commonwealth Expedition (who is crossing the continent from the Shackleton base) at Mount Albert Markham or even nearer the South Pole if time and circumstances permit.

Some of the geographical questions it is hoped will be answered are—Do the Ross and Weddell Seas join, dividing the continent into two? What is the nature of the rock underneath the ice cap and does it contain valuable minerals? What is the influence of Antarctica on the weather of the Southern continents? Is the depth of the ice increasing or decreasing? As nothing deteriorates in this climate, would it be possible to use Antarctica as a vast store house for materials and food?

At the end of the Geophysical Year it is possible that answers to many of the questions which have long puzzled men will have been found by the skilled scientists who are now working in these inhospitable Polar regions.

6th November, 1957.

During the past weeks many stirring events have been taking place in Antarctica, which are of great interest to all scientists and adventurers.

By the end of 1957 the United States expedition, from the Ellsworth base on the Weddell Sea, had made a very important geographical discovery. On the map the Filchner Ice Shelf is marked at the south of the Weddell Sea, but, after weeks of painstaking air and surface exploration, these scientists found a large island under the Shelf. It is about 200 miles long and 180 miles broad and, when the five-man traverse party crossed it, seismic soundings proved the land under the ice sheet to be hundreds of feet above sea-level. Many of its contours have still to be fully delineated but the island appears to have three wide bays, one of them 50 miles deep.

The Commonwealth Trans-Antarctic expedition has undergone a great change of plan. Dr. Fuchs' route from Shackleton base proved very difficult and he made slow and perilous progress, owing to the heavily crevassed ice surface leading to the plateau and ice ridges and crevasses extending as far as the depot at South Ice. He is also carrying out a complicated scientific programme which necessitates many stops. Sir Edmund Hillary, on the other hand, found fewer obstacles to rapid advance and reached the appointed rendezvous at Depot 700 so quickly that he decided to press on. He arrived at the South Pole on January 3rd, 1958, being the first man to do so overland since Captain Scott in 1912.

Sir Edmund and his team had a very different end to their exhausting effort from Captain Scott and his gallant companions, who were so disheartened to find, in the middle of a vast snowy waste, the Norwegian flag planted there by Amundsen a month before. The New Zealanders were welcomed by a party of U.S.A. scientists, flown in several months before, to establish a scientific observation post at the South Pole.

At the moment of writing, Dr. Fuchs is still a considerable distance away from the Pole and held up by poor snow conditions and "white-outs" and so Sir Edmund, whose supplies are short, has decided to fly back to Scott Base and then, when Dr. Fuchs is nearing the original meeting place at Depot 700, to fly there to welcome him and escort him over the difficult crevassed area at the plateau edge and down the Skelton Glacier to Scott Base at McMurdo Sound, to accomplish the first complete crossing of Antarctica.

6th January, 1958.

Astronomy and the International Geophysical Year

BY W. P. WINTER, B.SC.

British astronomers have many commitments in 1957-58, a date selected because it included a sunspot maximum and hence a period most suitable for work on Solar Physics. Even to-day our knowledge of the fundamentals of solar and terrestrial magnetism is descriptive rather than systematic and theoretical. The periodicity of about 11 years in sunspot activity is a matter of observation only, though the connection between this phenomenon and "solar flares", magnetic storms, aurorae, "radio fade outs" and the general intensity of "radio background noise" has become more evident and the further elucidation of the nature of these connections is one of the tasks of the year. Birkeland's work of 50 years ago has made it clear that an electron stream entering the earth's atmosphere is at least one causative agent though the view that these particles are "emitted from a hot body" in the sense of physical research of 1900, is now vigorously disputed. The deflection of such showers in plane curves by a transverse magnetic field and in helical paths by longitudinal fields has long been recognised as a necessary part of any theory of auroral rays.

Within the last 12 years it has been shown that neither aurorae nor magnetic storms are caused by sun spots which are areas much cooler than their surroundings, but by "flares" which are gigantic emissions of gas at a higher temperature than that of the sun's surface, i.e. above 6000°C. Frequently the flares are near the sunspots but not always so. Dr. Ellison of Edinburgh has shown that the spectrum of a flare is dominated by the $H\alpha$ line which is greatly broadened and Mr. Hey's work demonstrated that an intense radio emission from the neighbourhood of the flare accompanied the broadening of the $H\alpha$ line, both effects being only temporary. About 26 hours later a magnetic storm occurred on the earth, both horizontal and vertical fields showing marked variations and a great aurora was observed at nightfall. This year a striking aurora appeared at a time when no conspicuous spots were seen on the sun's disc, the flare responsible having escaped observation.

One important task now is to collate all evidence regarding the sun's atmosphere, or corona. The luminous part of this, seen at a total eclipse may extend from the photosphere to distances of two million miles and in 1954 Smith and Machin observed that when the sun was in Taurus, radio emission from the Crab Mebula was totally cut off for two days and greatly reduced in intensity for 8 days, thus showing that a solar atmosphere totally or partially opaque to radio waves extends to a distance of 9 million miles from the sun. Other considerations lead to the belief that a very rare atmosphere may extend as far as Saturn's orbit. Two theories at present contend for the explanation of this atmosphere; neither explains all the facts but a combination of the two may be useful. The "emission theory" asserts that the corona consists of hot gases emitted from the "boiling surface" of the sun in flares and cooler gases in prominences and these have cooled and diffused. The "infall theory" assumes that the sun continually draws to itself cosmic gases, mainly hydrogen, and that the molecules so attracted move towards the sun under the force of solar gravitation at rising velocities, clashing with emitted gases at about a million miles from the photosphere forming a "splash region". As the velocity increases so the temperature rises, the "kinetic temperature" being solely dependent on the molecular velocity. This gives rise to temperatures in the corona depending on whether the sun's surface is "quiet" or "disturbed" and which in the splash region vary from one million to twenty or more millions centigrade. But these are "kinetic" only; such gases do not radiate, otherwise all the planets would be consumed.

The emission theory is sometimes termed the "sound wave" theory, the emitted gases passing into less dense regions and exerting a pressure such as exists in sound waves under similar circumstances. Research by Mr. Jennison of Joddrell Bank suggests that under the impulse of the wave of hot gas emitted by the flares, particles attain a velocity giving them an energy equal to the ionisation potential of hydrogen, i.e., 13 electron volts. This would produce two streams, one of electrons and the other of protons, which, entering the earth's atmosphere in equal numbers, will account for the normal auroral phenomena. Recently Bristol University Physical Department has found that during an intense flare the strength of the cosmic radiation was more than doubled, a remarkable result since previously the intensity of these rays, though varying with latitude had been found remarkably constant at any fixed point, quite independent of solar or siderial time.

Radio astronomers have found flare radiation to consist of three frequencies having wave-lengths of 1.5, 3.0 and 4.5 metres respectively, appearing in this order and originating at levels varying from 20,000 to 200,000 miles above the photosphere. They have also determined the heights of auroral arcs as about 60 miles and rays rising to 300 miles. Stormer found exceptional rays at a height of 600 miles. From the strength of radio echoes it has been computed that 10 million electrified particles exist per cubic centimetre during the display. These questions as well as many related matters are ocupying the attention of considerable sections of British, Scandinavian, U.S.S.R. and U.S.A. teams during the Geophysical Year.

The selection of 1957-8 as the I.G.Y. was also influenced by the consideration that a sunspot maximum afforded opportunities for further research on the sun's influence on terrestrial magnetism. A quantity in frequent use in such work is the "Zurich Sunspot Number" given by the expression $k(10g+f)$ where g is the number of "disturbed areas" and f that of the number of individual spots observed in a given year, while k is a constant depending on the instrument used, and has a value 1 for the Zurich 8cm. telescope having a magnifying power of 64. As a measure of solar magnetic activity the Herstmonceux Number, based on daily spectroheliscopic photographs is coming into use, but has not yet displaced the Zurich figure, which varies from year to year, from 1 in 1910 to 151 in 1940. The hourly, diurnal and annual variations in the strength and direction of the earth's magnetic field as well as those dependent on the distance of the point of observation from the nearer magnetic pole, are all at their greatest when the Zurich number has a maximum.

While it is generally agreed that terrestrial magnetism is essentially a geophysical rather than an astronomical phenomenon the variations above referred to are the results of solar activity. A certain fraction of the sun's radiation known as "ultra violet" ionises the oxygen atom at great heights and low densities, liberating free electrons. These form the ionosphere consisting of D, E and F layers at approximate heights of 50, 60 and 160 miles respectively and in daytime the F band is doubled, an F_2 appearing well above the F_1 layer. The electron densities of these strata can be determined from the intensities of radio reflection and a long series of measurements has shown that the number of free electrons per c.c. in each is a quantity correlated with the Zurich or Herstmonceux sunspot numbers, and in the E layer during the last sunspot maximum of 1947-8 an increase of 50% was shown over its value in the preceding minimum period of 1943-4.

Closely connected with sunspot frequencies are the cyclic electric currents in the E layer of the ionosphere. These flow in closed circuits centred respectively at two points in latitudes 40°N. and S. and slightly west of the subsolar meridian, and keeping these positions with respect to the sun, while the earth rotates beneath them. The electro-motive force maintaining these currents is the rate of change of the magnetic flux threading the circuits, this flux being that of the earth's magnetic field. The carriers of these currents are the free electrons in the E layer, and as they rapidly recombine with positive ions during the nights the currents, which rise to 50,000 ampères by day, sink to 10,000 by night and change direction as in an A.C. generator. The strength of these magnetic fields were measured by recording magnetometers sent up in aerobee rockets just after the last sunspot maximum and were found to supply the qualitative and quantitative explanation of diurnal variation of the angle made by the magnetic needle with the meridian at any point. Wolf has shown that this diurnal variation is a linear function of the Zurich numbers and is approximately proportional to the electronic densities of the E layer.

It is expected that during the I.G.Y. further work with rockets carrying recording magnetometers will be undertaken in both E and D layers, particularly when large flares occur, to determine whether overhead currents fluctuate in such a manner as would indicate that they play a part in the short but very marked changes in both horizontal and vertical components of the earth's field which are simultaneous with the flare as Hey and Ellison have shown, and which appear on magnetometer records as *"les crochets magnétiques"*.

Both U.S.A. and U.S.S.R. included in their programmes for 1957-8 the launching of artificial satellites. At the time of writing two have been launched, one very small and another reported to weigh half a ton and containing instruments for automatic record and radio dispatch in code of temperatures and cosmic ray intensity, both of which are of great importance but of which we have at present no knowledge. Astronomers are profoundly interested in the opportunity of observing the orbits of satellites of negligible mass moving under the earth's gravitation at very small distances from the centre of force. Both sputniks move in perturbed ellipses, i.e., ellipses which continuously change the elements of their orbits. From these perturbations, which are rapid and large, mathematicians hope to obtain corrections to the lunar theory, as yet incomplete, as shown in 1927 when a total eclipse of the sun was 3 seconds earlier than the computed time, and one issue of the Nautical Almanac had to be corrected after publication. Further it is hoped that some information may be obtained regarding the densities of the earth at different levels since its spheroidal shape makes it impossible to regard the whole mass as concentrated at its centre when determining the pull exerted on so close a satellite. The fact that the periods of revolution were shortening initially by about 2 seconds a day affords means for the estimation of the resistance experienced and hence of the densities of the earth's atmosphere at heights up to 400 miles. Finally, Einstein's General Theory of Relativity requires that the major axis of Sputnik I should progressively revolve through nearly 1/500th seconds of arc per revolution or 1″ per month. This quantity should be separable from other perturbations, and for the first time astronomy has become an experimental science "in its own right".

6th January, 1958.

Some Physical Aspects of the International Geophysical Year

BY H. E. CLARKE, M.A., B.SC., F.R.I.C.

The aims and achievements of the two International Polar Years, 1882/3 and 1932/3, cannot fairly be claimed to have prepared us for what we are now witnessing in a co-operative enterprise of scientific enthusiasm unprecedented in the history of mankind. From an almost specialised programme in 1882 of exploration, meteorology and geography, entailing a financial burden necessarily borne by a few economically powerful partner nations, we have in 1957 the ardent participation in the I.G.Y.'s £100 million plans of practically every civilised country in the world and an astonishing growth of mutual respect between great and small.

That this is a geophysical and not simply another polar year is symbolic of the exciting emergence of physics in these later years, both in its theoretical aspects and in the truly gigantic applications now achieved by physics in industry, medicine, electronics, radiation and space travel, to mention only a few outstanding examples. To an extent never seen before the scientist and the ordinary citizen have come to realise that all men are parts of a world-embracing economy and subject to the unceasing play of forces which while they tie us to our home-planet at the same time open up for us the great universe around us. This year we are thinking in terms of world response to these forces and to the rain of radiation in which mankind has always lived, but of which he has until now either been unaware or thought far too little. We have now to give these things much more study, if only because they are entering increasingly into our daily concerns and must soon be features of the ordinary standards of civilisation expected of every up-to-date national community.

The astronomical and terrestrial studies engaging scientists at this moment are bound up with the more strictly physical investigations. Thus it is common knowledge that there is a fundamental connection between the prevalence near the sun's equator of spots and flares and the incidence on and near the earth of magnetic disturbances, aurorae, failures of radio transmission and the intensity of recorded radiation of both subatomic particles and electromagnetic energy. And in addition to these consequences of solar activity we are aware of the intense influence of little understood sources of cosmic and electromagnetic radiation in the deep universe: happily the latter has become an important branch of astronomy in its own right. The physicist finds in the impact of each and all of these forms of radiation in our upper atmosphere a rich field for research, and for this reason, as well as for the new knowledge he can collect in meteorology, he welcomes every advance in the means which are being developed for searching higher and higher into the thin air, such as "rockoons" and rockets.

recording and telemetering by their own apparatus conditions which have not yet been explored by workers in manned aircraft.

The fruits to be gathered from world-wide physical measurements on the scale of the I.G.Y. cannot be guessed at at this early stage, and any attempt to outline the programme actually in hand must necessarily have a tentative appearance. The following notes cannot therefore be much more than a catalogue of confident expectations of coming results.

Until a few years ago it appeared that, short of what would be found on actually entering it, meteorologists were in possession of most of the essential information about the upper atmosphere. The features of troposphere and stratosphere and the atmospheric movements associated with winds, rain and insolation, had been adequately explained. But for future elucidation the influences remained of hitherto unsuspected layers or zones of attentuated air, changes in some of which could interrupt radio communication, while in others chemical changes could be undergone (under bombardment from the sun's ultraviolet rays) resulting in unexpected local temperatures, such as those which prevail in the "ozone layer", some 30-50 miles above the earth's surface, where the air is as warm as at sea level at the equator. Again, that oddity the "sodium layer", in the air-glow region 80 or more miles above the earth's surface, has not received an explanation acceptable to all investigators, either as to its precise nature or origin.

The high regions of our atmosphere receive with unabated intensity not only the ultraviolet rays of the sun and the showers of particles thrown in our direction by our luminary, but also the rain of cosmic protons and electrons which reach us from little understood sources and which are the immediate causes of mesons and other highly penetrative particles known to bombard all levels of the atmosphere. We can fairly hope that new discoveries will show us more clearly how the ionised layers behave in magnetic storms and change their radio permeability, so that we may intelligently predict such changes. Also we are hoping to learn much more about the colossal air movements at high altitudes in the polar areas, which undoubtedly affect surface weather and which are an essential factor if we are to forecast weather in the Northern Hemisphere on a more ambitious scale than our present achievement of probable weather for a few days only. Without a much extended knowledge of the upper air high altitude flying also lacks fundamental data. At the moment what we think we know of these regions is largely confined to the indications and visible manifestations in them of aurorae and air-glow, both of which phenomena are primarily related to happenings in the sun and have their origin in the activation of atoms and molecules of air; the light from these can be spectroscopically examined and used to furnish information about the composition of this attenuated air. When the aurorae are most brilliant unusually great disturbances in the distribution of the earth's magnetic field read at sea level are always observed, which emphasises the close connection existing between phenomena manifested at all levels of our atmosphere.

But direct access of appropriate measuring instruments to regions of special scientific interest is obviously of particular importance, and a great feature of the I.G.Y. is the use on an impressive scale of instrument-carrying balloons flown to altitudes of as much as 100,000 feet, and the construction of rockets, such as that christened *Skylark,* which some meteorologists believe may be instrumental in securing data for better weather forecasting and ultimately for weather control and regulation. *Skylark,* designed under Royal Society and R.A.E. auspices purely as an unmanned experimental piece of apparatus, will carry a payload of 150lbs. to an altitude of 90 miles. It has 24 distinct instruments, each of which can transmit to earth stations 100 radio signals per second. Its instrumentation and that of numerous other rockets in the British programme has been the joint responsibility of six Universities and University Colleges. The life term of these experimental apparatus cannot of course compare with that of the Russian and forthcoming American artificial satellites moving in high orbits, but in their own more restricted application they do represent an advance of great significance and originality.

The sun, as an emitter of energy and radiant particles, brings a relevance between astronomy and physics for long unsuspected. Nowhere is this more evident than in the study of the earth's magnetic field. It has been a commonplace in elementary studies to conceive of the earth as a great bar magnet with poles emerging at the N. and S. magnetic areas, and with a field of "lines of force" (in the Faraday sense) sweeping from pole to pole in great curves, some of which extended into space for undetermined distances above the surface of the earth. Elements of this field had been recognised for centuries by lodestones and compass needles and within the last century small diurnal variations in direction and intensity of a more or less predictable kind had suggested that the sun had some sort of influence on the earth's magnetism as measured at sea level. But now we know that this field is crossed and traversed by the numerous layers of the ionosphere in which are changing concentrations of charged ions, in other words, electric currents of great and changing intensities for which the sun must be answerable. To what extent if at all the sun is a controlling factor in the secular variations of intensity and direction of the earth's magnetic field remains for more complete elucidation. We know, for example, that in 1850 the N. magnetic pole was 22°W. of true North, but that by 1950 it had approached to within 9°W. of true North. Work proceeding during the I.G.Y. will go far to decide whether this movement is due solely to changes within the earth itself, or whether solar energy plays a significant part. The data from which new speculation can be initiated will also be supplemented by new seismic studies of the way in which deep quakes and tremors are propagated into and through the core of the earth. There is no unanimity of opinion about the chemical and physical nature and condition of the core, but it is much more generally held than formerly that not only the core but also the mantle and crustal layers of the earth are subject to material movements, some of which may be secular and extremely slow in nature.

However, the main concern of physicists working on geomagnetism this year will be with short term variations in the magnetic field, and particular attention is to be given to magnetic storms and their sources which, as already remarked, are largely in the sun.

An interesting feature in this connection is that the strong currents flowing in the ionosphere, which upset terrestrial magnetism, also induce weaker currents in land and sea and furnish a means for experimental study of the earth's crust and (remarkably enough) of the way ocean currents circulate and distribute the salinity of the seas. It is realised that a wide extension of meteorological and magnetic observations by the establishment of more stations, especially in the Polar Circles, would not only greatly assist navigation at sea, but would also enrich the store of information available to oceanographers. Seismologists have also pointed out that earthquake style of investigations can only give instantaneous pictures of the deep structure of the earth and that great use could be made of frequently repeated magnetic observations taken at or near the same places carefully distributed over selected areas, resulting in a virtually continous story of happenings in the earth's core and deep rocks. How desirable it is that a real extension of our knowledge of the interior of the earth should come quickly is well illustrated by a reflection in which the sun again comes to mind. The sun is our nearest star, but he is 93 million miles away. Nevertheless it may fairly be claimed that we really know a good deal more about what is actually happening in the sun than we do about the earth fifty miles beneath our feet. The devastating inaccessibility of the earth should surely not remain one of our humbling admissions when the I.G.Y. ends on December 31st next and scientific research once again goes back into low gear.

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